

**INNOVATIVE DIGITAL START-UPS AND THEIR VENTURE
CREATION PROCESS WITH ENABLING DIGITAL PLATFORMS**

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UNIVERSITY OF WESTMINSTER

**INNOVATIVE DIGITAL START-UPS AND THEIR
VENTURE CREATION PROCESS WITH
ENABLING DIGITAL PLATFORMS**

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the University of Westminster for the degree of Doctor of Philosophy

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ABSTRACT

Start-ups have gained media attention since Google, Facebook and Amazon were launched in the 1990s. The book *Lean Start-up*, published in 2011, was another important milestone for digital start-up literature. As unicorn companies emerge around the world, topics highlighted in the news include the vast amount of capital that digital start-ups are raising, the ways in which these digital ventures are disrupting industries, and their global impact on digital economy. However, digital start-ups, digital venture ideas, and their venture creation process lack a unified venture creation model, as there is a gap in the research on entrepreneurial processes in a digital context. This research is an explorative study of the venture creation process of innovative digital start-ups that examines what is missing from entrepreneurial process models in a digital technology context and investigates how early stage digital start-ups conduct the venture creation process, starting with the pre-phase of antecedents and ending with the launch and scaling of the venture.

The research proposes a novel process model of innovative digital start-up venture creation and describes the nature and patterns of the process. A conceptual model was developed based on the entrepreneurship, information systems, and digital innovation literature and empirically assessed with a multi-method qualitative research design. The data collected from semi-structured interviews, internet sources, and observation field notes covered 34 innovative digital start-ups and their founders. Interviews were conducted internationally in high-ranking start-up ecosystems, and the data were analysed with thematic analysis and fact-checked by triangulating internet data sources. The contribution to entrepreneurship theory is a new illustrative model of the venture creation process of innovative digital start-ups, including the emergent outcome of the process having a digital artefact at its core (e.g., mobile apps, web-based solutions, digital platforms, software solutions, and digital ecosystems). Digital platforms and their multiple roles in the process are presented, as well as the role of critical events as moderators of the process which trigger new development cycles. During the venture creation process, the recombining of digital technologies, modules, and components enabled by digital infrastructures, platforms, and ecosystem partners represent digital technology affordances. This recombination provides opportunities for asset-free development of digital venture ideas.

Keywords: digital entrepreneurship, venture creation process, digital innovation, digital platforms, digital business models

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LIST OF USED ACRONYMS AND TECHNOLOGIES

Acronym or technology	Explanation	Examples, references
AI	Artificial intelligence	
Algorithm	A process or set of rules to be followed in calculations or other problem-solving operations	
API	Application Programming Interface	'a set of tools, protocols and subroutines, for building application software, it helps to develop the computer program by proving the needed building blocks' (Jacobson, Brail and Woods, 2011).
ASR technology	Automated Speech Recognition	
App or application	Mobile App can be IOS (Apple Store) or Android (Google Play Store) operating systems based mobile solutions	
Blockchain	Distributed ledger technology	(Underwood, 2016)
BRDF	Reflection technology, Bidirectional Reflectance Distribution Function	
BM	Business Model	
BMI	Business Model Innovation	
Cloud	Cloud computing services, either private cloud or public cloud	Service providers: e.g. AWS, Cresco, Google Cloud, Ali Cloud, Heroku, Digital Ocean
CEO	Chief executive officer	
CTO	Chief technology officer	
Database, DB	Integrated storage of digital data	Service providers: e.g. AWS, Google Cloud, MongoDB
ETH	Ethereum, blockchain-based distributed computing platform, the token is called Ether	Webpage https://ethereum.org/en/
GDPR	The General Data Protection Regulation	Webpage https://gdpr.eu/
GitHub	Web-based hosting service for versions of computer code	Webpage https://github.com/
HubSpot	Software products for inbound marketing and sales,	Webpage https://www.hubspot.com/

Acronym or technology	Explanation	Examples, references
	marketing automation platform	
ICO	Initial coin offering	Crypto currency (token) offering (Adhami, Giudici and Martinazzi, 2018)
iCore	Business integration platform for testing	Webpage https://www.icoresolutions.com/products-services/icore-integration-suite
IPO	Initial public offering	Company going public (Ritter and Welch, 2002)
Jinri Toutiao	Equivalent of Twitter + Facebook, a China based digital platform used for advertising	Webpage https://www.toutiao.com/
OCR	Optical Character Recognition	
Nano Ledger	certified hardware wallet to protect crypto assets	(NanoLedger, 2019)
NLP	Natural Language Processing	
PKI	Public Key Infrastructure	
PaaS and iPaaS	Platform as a service and integration Platform as a service	iPaaS ‘a suite of cloud services enabling development, execution and governance of integration flows connecting any combination of on premises and cloud-based processes, services, applications and data within individual or across multiple organizations’ (Gartner Inc., 2020)
PSP	Payment service provider	Service providers: e.g. PayPal, WeChat Pay, Stripe
PSD2	PSD2 payment services directive (EU)	Webpage https://ec.europa.eu/info/law/payment-services-psd-2-directive-eu-2015-2366_en
QR-code	Quick Response	
Responsive web-design		https://www.w3schools.com/html/html_responsive.asp
RFP	Request for proposal	(FERRIERE, 2017)
SaaS	Software as a Service	
SDK	Software Development Kit	
WeChat	ecosystem (e.g. WeChat Pay, messaging & social WeChat, gaming, Tencent cloud, music, video)	(Zhang, 2018)
WhiteSource	open source license management and security solution	

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DECLARATION

I declare that all the material in this thesis is my own work.

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1 INTRODUCTION: INNOVATIVE DIGITAL START-UPS

'The goal is clear: a quickly scalable, asset-light global business model' (Umbach, 2019).

Start-ups have been highlighted by political, business, and cultural leaders around the world for various reasons. At the annual World Economic Forum in January 2019, leaders discussed how a business could become a digital platform business such as Airbnb, Uber, and Apple's AppStore, who are building their businesses in a new way. In 2016, Britain had a record number of start-ups (Bounds, 2017), and although that number decreased from 2017 to 2018 due to Brexit (Bounds, 2019), the number of start-ups increased in Britain in 2018 (Booth, 2019).

In the past 10 years, digital start-ups have gained a great deal of media attention. News about digital start-ups frequently features headlines such as 'Venture capital investment in start-ups has surged to its highest level ever — \$148 billion last year alone' (Pridham, 2018) and 'Digital health start-ups raised an all-time high of \$11.5 billion in 2017, topping 2016's record of \$8 billion' (*StartUp Health Insights Global Digital Health Funding Report Q3 2018*, 2018). The number of unicorn companies is growing; companies with at least \$1 billion USD evaluation rose from 326 in 2019 to 636 in 2020 (Desjardins, 2018; Crunchbase, 2020). The top company on the list is Toutiao, a Chinese digital social media company (USD \$75 billion) (Szmigiera, 2019). At the company level, digital unicorn companies are emerging worldwide, such as Amazon, Facebook, Instagram, and Salesforce (US); WeChat, Toutiao (China); Revolut and Deliveroo (UK); Careem (UAE); PayTM (India); Yellow Mobile (South Korea); Taxify (Estonia), Klarna, Spotify, and Skype (Sweden); Supercell (Finland), which was acquired by Tencent (China) in 2019; and Yamsafer (Palestine). Furthermore, the list of unicorn companies is growing.

The digital start-up phenomenon is global as well as local, and it is challenging incumbent businesses and their business models (BMs) at the company level all over the world.

Start-ups with a digital platform at their core, a new type of BM, have become unicorn companies (e.g., Amazon, Facebook, Google; (Wladawsky-Berger, Kenney and Zysman, 2016), and the power of digital platforms has become an area of interest (Bughin and van Zeebroeck, 2017).

At the country level, new start-up ecosystems are emerging (Hermann, 2015; Genome, 2017; Genome *et al.*, 2018). Also referred to as entrepreneurial ecosystems (Autio *et al.*, 2017; Spigel and Harrison, 2018; Autio and Cao, 2019), they specialise in fostering digital start-ups. Cities invest in building them; for example, Tel Aviv offers tax cuts and invests in start-up programs and investment companies (Sheppard, 2018). Private funding is behind the start-up ecosystem development in Paris (Connan, 2018). Twenty-nine start-up ecosystems created over \$4 billion USD in ecosystem value between 2016 and 2018, while there were 46 ecosystems between 2016 and 2018 (Genome, 2019).

Start-up ecosystems gain popularity by hosting start-up events and offering co-working spaces. The number of start-up related events is vast, including conferences, meet ups, start-up ecosystem events, and start-up seminars. Moreover, these events are well-attended; the Web summit conference in Lisbon drew 70,000 attendees in 2019 (Web Summit, 2019); the Slush start-up conference in Helsinki had 25,000 attendees in 2019 (*Slush Helsinki*, 2019); and the Start-up Grind conference in Silicon Valley drew 8,000 attendees in 2018 (Startup Grind, 2018). The number of incubators and co-working spaces is also growing rapidly; the forecast is that there will be 30,432 co-working spaces and 5.1 million new members by 2022 (GCUC, 2018).

A recent report by Slush (Soaked, 2020) which analysed 15,000 start-ups participating in the SLUSH start-up event from 2016 to 2019 found that the strongest trend in start-up applications was the mention of the word 'platform'. Start-up entrepreneurs are a major driver of innovation due to the widespread diffusion of digital technology, which appears to be lowering barriers to entrepreneurial activity (Blank, 2013; Fichman, Dos Santos and Zheng, 2014). The EU published a digital transformation scoreboard in 2018 (Probst *et al.*, 2018) to monitor the changes related to the digitisation of European companies.

Even though the number of start-ups is rising, new ventures face many challenges, including constant risk and uncertainty (Knight, 2012). Research shows that three out of four start-ups fail (Gage, 2012). The formation of new companies alone is not enough to help with job creation or a positive economic outlook. These new start-ups must also survive the 'valley of death' and the 'liability of newness' (Stinchcombe, March 1965). In addition, the creation of a new venture is a complex and challenging phenomenon (Gartner, 1985;

Colombelli, Krafft and Vivarelli, 2016); the uncertainty of the future also brings an additional risks to the journey. The challenges and opportunities new start-up entrepreneurs face today include a turbulent business environment, rapid pace of change, uncertainty related to new technology, and new ways of organising businesses.

Innovation and start-ups go together; the typical reason for a new start-up venture is a new idea, a new opportunity, or an individual or a group of people wanting to develop an idea. Uncertainty and risks are high since start-ups lack the resources that established companies have, but there are also advantages of being a start-up. New technology, radical or disruptive digital innovations, and the possibility to test and develop new products and services faster in volatile and uncertain markets may also be ways for start-ups to build a successful venture.

Further study is needed to understand more about new innovative digital ventures and how they develop their ideas. The digital world, or digital context, needs to be investigated as well, including the characteristics which enable a new digital start-up company to outperform an incumbent, established company with many assets. Digital platforms and their role in start-up development are an essential part of the digital context, and they are relevant to this research. This research is interested in exploring and understanding how an early stage, innovative digital start-up conducts the process of new venture creation.

1.1 Positioning this research in the academic literature context

This research integrates the entrepreneurship, innovation management, and information systems (IS) disciplines. Entrepreneurship research is interested in how new business ideas are developed and transformed into businesses. Within this venture creation process, the early stages are the main interest. In the field of entrepreneurship, innovative start-up companies, rather than established, incumbent companies, are the focus.

However, the entrepreneurship literature alone is not sufficient to cover the area of this research because the interest is in innovative start-ups, and the venture creation process occurs in the 'digital world'. Entrepreneurship in the digital context is called digital entrepreneurship (Nambisan, 2017; Zaheer, Breyer and Dumay, 2019), but the research is still

in its embryonic stage. This research is multidisciplinary because studies of both innovation management and information systems are needed to cover the areas of interest.

In the management science discipline, the focus of innovation management studies has moved towards open innovation and user-oriented ways to innovate (Gassmann, Enkel and Chesbrough, 2010; Greer and Lei, 2012). In recent years, the digital world has led to the reinvention of innovation management theories due to the new characteristics of digital innovation (e.g., the relationship between innovation process and outcome) (Nambisan *et al.*, 2017). Information systems literature defines the characteristics, concepts, and nature of digital technology and thus helps study how digital technology is affecting and changing the entrepreneurial venture creation process. In addition, IS literature discusses digital innovation (Yoo, Henfridsson and Lyytinen, 2010; Fichman, Dos Santos and Zheng, 2014), which is relevant to research on the innovative digital start-up venture creation process.

Figure 1-1 illustrates the three disciplines and the focus of this multidisciplinary research.

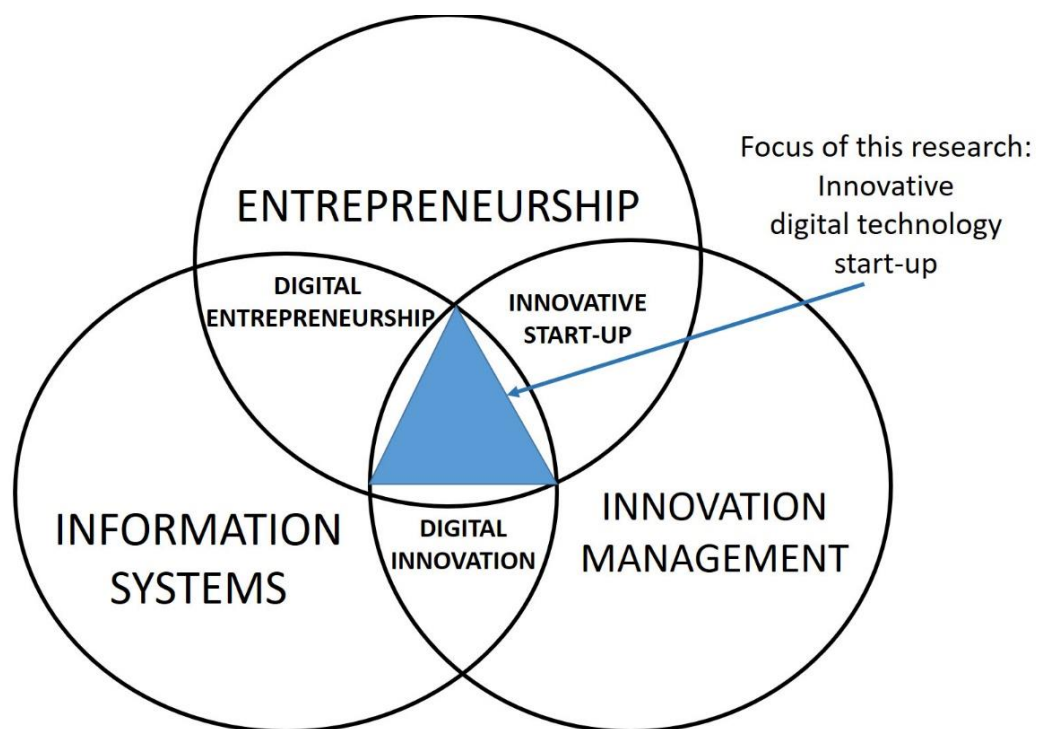


Figure 1-1 Areas of science and focus of this research

The following sections present the research aim and context, and the research questions are formulated.

1.2 Research aim

Social science asks, ‘What is going on (descriptive research), and why is it going on (explanatory research)?’ (Vaus, 2001). The aim of this research is to study the entrepreneurial venture creation process in the new digital context. No universal model exists for the entrepreneurship process (Moroz and Hindle, 2012), nor for the venture creation process, nor for the entrepreneurial process in a digital context. To ‘understand what is going on’, this research aims to explore and create a model of the entrepreneurial venture creation process for innovative digital technology start-ups and to identify possible patterns. The first step was to create a theoretical framework which described the process based on previous studies. Second, the framework was assessed with empirical evidence to verify its validity and assess how well it reflected reality. Subsequently, a new model was created, and the possible patterns of the venture creation process were empirically sought and described.

1.3 Research context

The context of this research includes the venture creation process, digital technology, early stage start-ups, innovative as opposed to non-innovative start-ups, and start-up ecosystems in various geographical locations. The scope of the core concepts are defined in the following sections: unit and level of analysis (Section 1.3.1), definition and characteristics of a start-up (Section 1.3.2), definition of digital technology (Section 1.3.3), definition of innovative digital start-up (Section 1.3.4), and geographic location and generalisability (Section 1.3.5).

1.3.1 Unit and level of analysis

This research commenced by studying start-ups and analysing relevant studies related to start-ups. The more the research on start-ups advanced, the more evident it became that the unit of analysis needed to change from the start-up to the start-up venture creation process, since entrepreneurship research is shifting towards the process view of entrepreneurship (Hjorth, Holt and Steyaert, 2015; Dimov, 2018a), as well as towards studying the opportunity-related processes (Alvarez, Barney and Anderson, 2013; Hjorth, Holt and Steyaert, 2015) of opportunity creation, identification, evaluation, development, and exploitation. The analysis takes place at the organisational level instead of the institutional,

market, social, or individual levels (Packard, 2017, p. 544) because the process view of entrepreneurship examines how companies change over time and searches for new ways to combine collective resources. This research adopts the definition of entrepreneurship as ‘a distributed, emergent process, one involving surprises and unintended consequences despite and even because of the interpretations, intentions, and motivations of the entrepreneurs involved’ (Garud, Gehman and Giuliani, 2018, p. 63).

Unit of analysis: venture creation process

Informant: the entrepreneur and members of the team

Focus: early stage, innovative digital technology start-ups and their process of venture creation

Level of analysis: organisational level

1.3.2 Definition and characteristics of a start-up

The term ‘start-up’ can either refer to a stage of the organisational life cycle or describe the venture. The start-up venture is positioned in the organisational lifecycle as a start-up stage (Jawahar, McLaughlin 2001, Hanks 2015). The start-up phase (or, as it is called in this study, ‘organisational emergence’) can be further divided into the following four stages (Carter, Han 2015): start-up intentions, gestation, infancy, and adolescence. However, this research does not adopt this idea of four stages because the linear stage model of venture growth is not supported.

In the literature, the start-up phase is referred to in many ways: pre-ante stage and gestation period (Pena 2004, Pena 2002); organisation in vitro (Hansen, Wortman 1989); organisational emergence (Gartner 1993, Tornikoski, Newbert 2007); preorganisation (Hansen, Allen 1992); pre-launch or business launch (Van Auken 1999, Kuratko, Hornsby et al. 1997); organisational birth (Hanks 2015); entrepreneurs with new combinations (Schumpeter 1934); the process of starting a small business (Gibb, Ritchie 1982); new business (Gatewood, Shaver et al. 1995); creating a business out of an idea, skill, or product (Birley 1986); new venture creation (Gartner 1985, Cooper 1981); new venture start-up process (Naffziger, Hornsby et al. 1994); and new venture start-up activities (Cooper, Gimeno-Gascon et al. 1994).

There are also a variety of ways to define a start-up based on its source and discipline. Oftentimes, the terms ‘small business’, ‘business start-up process’, ‘nascent entrepreneur’ and ‘start-up’ are used interchangeably (Delmar, Davidsson 2000), (Rotefoss, Kolvereid 2005). A start-up company can be defined from several points of view, including as a venture capitalist (VC) ‘early stage of start-ups (also called the start-up stage or seed stage), which can be described as ‘the state of a company when it has just been incorporated and its founders are developing their product or service’ (NVCA, 2013, p. 74). Furthermore, the ‘early stage begins with the initial work on the start-up (i.e., the founders begin to work on an initial idea) and typically ends either with the start-up receiving Series A funding or being discontinued. During the early stage, companies are typically funded by founders’ savings, friends and family, angel investors or seed funding’ (Spiegel *et al.*, 2016, p. 425).

1.3.3 Definition of digital technology

The digital technology context where the innovative digital start-up process of venture creation takes place is of interest to this research. The digital technology context can be defined from the entrepreneurial point of view as ‘three distinct but related elements – digital artefacts, digital platforms, and digital infrastructure’ (Nambisan, 2017, p. 3). Alternatively, it can be described from a technological point of view which states that digital technology consists of devices, networks, services, and contents which are orchestrated by layered, modular digital architecture (Yoo, Henfridsson and Lyytinen, 2010, p. 724). This research adopts both of these definitions.

1.3.4 Definition of innovative digital start-up

The focus of this research is on innovative digital start-ups (Colombelli, Krafft and Vivarelli, 2016). Innovativeness refers to a venture creating or using new technology, business model, product, service, or process innovation or a combination of these as an answer to a customer need. The term ‘innovative start-up’ (Colombelli, Krafft and Vivarelli, 2016) is used for a start-up that is not a follower or copier in the market but has created something new. Moreover, the creation of new firms is a complex phenomenon, and the majority of ‘the genuine Schumpeterian innovators are neck to neck to innovative followers,

passive replicators, and defensive and necessity entrepreneurs' (Colombelli, Krafft and Vivarelli, 2016, p. 279), Schumpeterian innovations refer to introduction of new combinations, new quality of the product, new method of production, new market, or a new sources of raw-materials, and new organization of an industry (Hagedoorn, 1996).

This research is interested in innovative and digital start-ups; thus, the creation or use of new digital technology needs to be involved in the venture, as for a start-up to be digital, it must have a digital artefact at the core of the venture idea (von Briel, Recker and Davidsson, 2018). The definition of an innovative digital start-up for this research is as follows: *a team of one or more highly motivated and driven people trying to solve a problem or serve clients or users with a new digital venture idea, which they are trying to turn into a business by searching for a new business model, with new digital technology at the core of the venture idea, not necessarily a legal company yet, hope for scalability.*

1.3.5 Geographic location and generalisability

In the entrepreneurship discipline, the process of venture creation cannot be studied without context, as is emphasised in the following quote regarding the role of geography and location:

‘Broadly defined, space is an important dimension of the entrepreneurial context. Entrepreneurship researchers have studied the effect of the spatial dimension of context by highlighting the role of geography and location in where new ventures develop and grow [...] some researchers do not pay adequate attention to the context of their research, often importing and applying existing theories from other disciplines to new entrepreneurial phenomena’ (Zahra, Wright and Abdelgawad, 2014, p. 487).

The aim of this research is not to explore digital start-ups from a single country, industry, or company type (e.g., B2B or B2C), but rather to create a more generalisable model. This is achieved by exploring start-ups in different international locations and by investigating start-up ecosystems and their rankings (Genome and Crunchbase, 2018). This research adopts the definition of a start-up ecosystem as ‘a conceptual umbrella for the benefits and resources produced by a cohesive, typically regional, community of entrepreneurs and their supporters that help new high growth ventures form, survive, and expand’ (Spigel and Harrison, 2018, p. 152).

This research aims to describe the venture creation process at both the abstract level and the practical level. An example of how different geographic contexts affect the venture

creation process is the regulatory environment. Regulations in different geographical markets and countries vary; for example, when the Uber taxi service was developed and launched, it was illegal in many countries, including Finland (Rhodes, 2017; *Reuters*, 2018). Uber tried to enter certain EU markets by claiming it was a technology company instead of a taxi company, but they lost the battle (Fung, 2017). Many European countries have thus changed their regulations for taxi companies.

This research gathered data from start-ups representing 12 start-up ecosystems: Helsinki, Stockholm, London, Berlin, Paris, Dublin, Tel Aviv-Yafo, Shanghai, Beijing, Hong Kong, Bangalore, and Silicon Valley.

1.4 Formulation of research questions

The ways to focus and clarify descriptive research questions (Vaus, 2001, pp. 17–18) are to specify the scope of the research, scope of core concepts, time frame for description, geographical location, generality of the description, aspects the research is interested in, abstraction of the interest, and unit of analysis. Bearing this in mind, the main research question (MRQ) is as follows:

How do innovative digital start-ups conduct the venture creation process with enabling digital platforms?

The sub-questions (SQ) are as follows:

1. How does the digital context affect the entrepreneurial venture creation process?
2. What is the role of platforms in the venture creation process of innovative digital start-ups?
3. What is the nature of and what factors affect the venture creation process of innovative digital start-ups?

Table 1-1 presents the research questions and contribution to knowledge. The next chapter discusses the research context in greater detail.

Table 1-1 Research questions and aimed contributions to knowledge

Research questions	Intended contribution to knowledge	Chapter/Section
MRQ: How do innovative digital technology start-ups conduct the venture creation process with enabling digital platforms?	A descriptive and holistic model of the venture creation process of innovative digital start-ups	Chapter 6, Section 6.4, and illustrations of the model (Figure 6-2 and Figure 6-3)
SQ1: How does the digital technology context differ from the traditional entrepreneurial context?	Digital technology context as a new context for venture creation process. The effects of digital technology context to venture creation process, new digital building blocks, different nature of the venture creation process.	Chapter 2, Section 2.3, and Sections 6.4.2, and 6.5.1
SQ2: What is the role of platforms in the venture creation process of innovative digital start-ups?	Role of digital platforms in venture creation process of innovative digital start-ups	Sections 2.3.5, 2.6, Chapter 3, Sections, 5.3.5, 6.3, Table 6-4
SQ3: What is the nature of and what factors affect the venture creation process of innovative digital start-ups?	Type of factors are moderating the venture creation process	Sections 2.4.2, 2.6, 3.1.1, 5.4.5, 6.2 and 6.4

1.5 Scope of research summarised

The scope of this research is summarised in this section (see Table 1-2). The aim of the research and the research questions help narrow down the topic by clarifying and specifying the scope of the descriptive research (Vaus, 2001).

Table 1-2 Summary of the scope of the research

	Within the scope and interest of this study	Chapter
Aim of the research	To explore and describe the model of the entrepreneurial venture creation process of innovative digital start-ups and attempt to find possible patterns	Chapter 1
Unit and level of analysis	<i>Unit of analysis:</i> venture creation process <i>Informant:</i> the entrepreneur or team <i>Focus:</i> early stage, digital technology, innovative start-up <i>Level of analysis:</i> company- and process-level	Chapter 1
Definition of start-up and time frame	Early stage begins with the initial work on the start-up (i.e., the founders begin to work on an initial idea) and typically ends either with the start-up receiving Series A funding (a major investment by venture capitalists to support growth) or being discontinued. During the early stage, companies are typically funded by founders' savings; friends and family; angel investors; or seed funding (Spiegel <i>et al.</i> , 2016, p. 425).	Chapter 1
Definition of innovative digital start-up	A team of one or more highly motivated and driven people trying to solve a problem or serve clients or users with a new digital venture idea, which they attempt to turn into a business by searching for a new BM with a	Chapter 1

	Within the scope and interest of this study	Chapter
	new digital technology at the core of the venture idea; it is not necessarily a legal company yet, and the founders hope for scalability	
Definition of innovative start-up	Using new technology, BM, product, service or a process innovation or a combination of these as an answer to the customer need	Chapter 1
Geographical location	Ranked global start-up ecosystems, participating start-ups from Helsinki, Stockholm, London, Berlin, Tel Aviv, Paris, Silicon Valley and SF Bay Area, Beijing, Shanghai, Hong Kong, and Bangalore	Chapter 4
Level of abstraction	Describe the venture creation process at an abstract level and at a practical level	
Digital technology context	Devices, networks, services, and contents which are orchestrated by layered, modular digital architecture, as well as from the entrepreneurial point of view (platforms, ecosystems, and infrastructures)	Section 2.3
Contribution to knowledge	A new model of venture creation process of innovative digital start-ups	Chapter 6 and Section 7.2.

2 ENTREPRENEURIAL PROCESS MODELS, DIGITAL CONTEXT, DIGITAL ENTREPRENEURSHIP, AND DIGITAL INNOVATION

'Entrepreneurship is the pursuit of opportunity, without regard to resources currently controlled.' - Howard Stevenson (Priem et al., 2018, 22)

The aim of this research is to study innovative digital start-ups and their venture creation process, as well as to create a holistic model of the process and find possible patterns. This research started by conducting a literature review of the venture creation process and process models in entrepreneurship. As the concept of opportunity is a reoccurring theme when studying the venture creation process, a general literature review of entrepreneurial opportunities is presented first (Section 2.1), followed by a systematic literature review of the entrepreneurial venture creation process and opportunity development (Section 2.2).

As the research aim is to examine entrepreneurial venture creation in the digital context, the third section is a general review of literature studying characteristics, concepts, and value creation in a digital context (Section 2.3). The fourth section studies narrative digital entrepreneurship, digital opportunities, and the nature of digital venture creation process (Section 2.4). Digital innovation is discussed in Section 2.5 via a general literature review which identifies the characteristics and models of the digital innovation process. The last two sections of the literature review investigate the existing venture creation process models in the digital context, the missing concepts (Section 2.5), and the research gap (Section 2.6). The structure of the literature review is shown in Figure 2-1, where the area marked as blue illustrates the digital context.

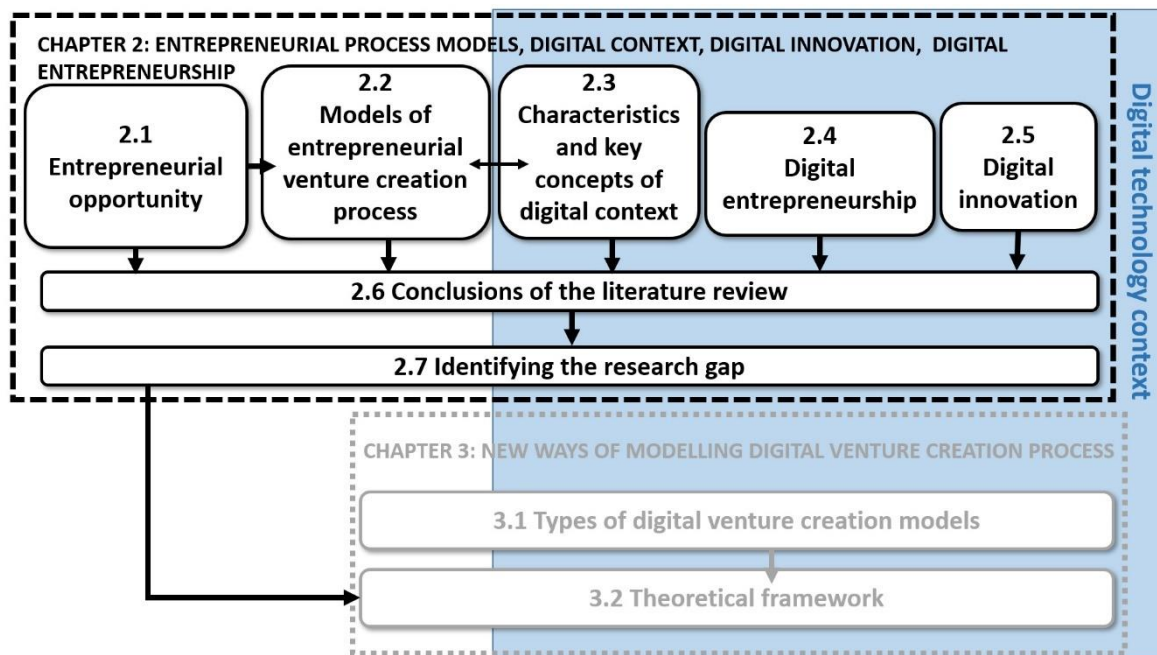


Figure 2-1 Structure of literature review, Chapter 2

2.1 Entrepreneurial opportunity

The concept of opportunity has become central for entrepreneurship researchers (Shane and Venkataraman, 2000; Eckhardt and Shane, 2003; Short *et al.*, 2010), and entrepreneurship involves phenomena and processes related to discovering, evaluating, and exploiting opportunities to create future goods and services (Shane and Venkataraman, 2000; Choi and Shepherd, 2004). For this reason, the concept of opportunity is studied first, followed by the process of venture creation.

There are two conceptualisations of the entrepreneurial process: new venture creation and opportunity development. New venture creation captures the *form* of entrepreneurial process as a new venture is created, while opportunity development is the *substance* of entrepreneurial process (Dimov, 2018a, p. 8).

The discussion on entrepreneurial opportunities presents three research problems. The first one is how to define an opportunity (Davidsson, 2015); the second is how the opportunities come to exist, whether they are recognised, discovered, formed, or created (Shane and Venkataraman, 2000; Zahra, 2008; Alvarez, Barney and Anderson, 2013; Ra-

moglou and Zyglidopoulos, 2015; Suddaby, Bruton and Si, 2015); and the third is ‘how opportunities are developed’ – the processes and the mechanisms of opportunity development (Moroz and Hindle, 2012; Venkataraman et al., 2013).

The first question as to what is considered an ‘entrepreneurial opportunity’ and how to define the term has long been an area of interest (Hansen *et al.*, 2011) and is still actively debated (Berglund and Korsgaard, 2017; Davidsson, 2017; Matthew S. Wood, 2017; Matthew S Wood, 2017; Ramoglou *et al.*, 2017). It is relevant to this research for two reasons: first, due to the implications of the definition on the opportunity development process, and second, because digital technology is creating new ways to identify, conceptualise, and develop opportunities (Nambisan, 2017; Standing and Mattsson, 2018).

2.1.1 Evolving definition of entrepreneurial opportunity

The definition of entrepreneurial opportunity has changed since the era before the world wide web to become more abstract and interactive (see Table 2-2). The pre-internet era (before 1989) (*History of the Web*, 2020) saw opportunities as ‘the new goods, services, raw materials, and organising methods that can be introduced and sold at greater than their cost of production’ (Casson, 1982; Shane and Venkataraman, 2000, p. 220). The era after the creation of the world wide web and before the mobile application (1991–2008/2010) was more abstract, with opportunity being ‘anchored in a product or service which creates or adds value’ (Timmons, Spinelli and Tan, 1994).

Apple launched the iPhone in 2007, and its App Store went online in 2008 (Strain, 2015). After mobile applications became popular, the definition of opportunity became more abstract and interactive over time. For instance, Busenitz et al. (2014, p. 4) defined it as ‘the discovery or creation of new means–ends relationships that can evolve from interactions between markets and environments’, and ‘an opportunity itself to be a process rather than a thing’ (Hjorth, Holt and Steyaert, 2015, p. 5). In Table 2-2 the evolving definition of opportunity is presented, illustrating how it has changed over time. The digital technology perspective is not included in these definitions.

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The actor - new venture idea nexus (Davidsson, 2015) suggests an alternative conceptualisation of entrepreneurial opportunity by breaking it down into three parts: external enabler, new venture idea, and new venture creation. This model has raised critiques for dividing opportunity into components instead of accepting the diversity in definitions and using the term 'opportunity' as an umbrella construct (Matthew S Wood, 2017; Matthew S. Wood, 2017).

An opportunity which exists in the future can only be described by words, and this pronunciation brings the elements of opportunity (Dimov, 2018b). Something is introduced with imagined contributors, materials, and activities, which will then be sold to imagined customers, and financially tallied to imagined or estimated revenues and costs (see Table 2-1).

A relevant question is whether all the opportunities are the same. Could there be more than one kind of opportunity? For example, could opportunities be based on scale (Gaglio and Winter, 2009, 2017)? Opportunities can be distinguished as small- or large-scale (Shane, 2003), by the stage of opportunity life cycle (Plummer, Haynie and Godesiabois, 2007), or by the type of opportunity (Ardichvili, Cardozo and Ray, 2003). There is also a distinction between ordinary and extraordinary (Yu, 2001) opportunities and opportunities as dreams, problem solutions, or technology transfer of business formation (Ardichvili, Cardozo and Ray, 2003). These views neither distinguish between digital and non-digital opportunities nor illuminate how the digital context defines the opportunity.

Table 2-1 Elements of opportunity (Dimov, 2018b, p. 21)

Something	Imagined product or service
Introduce	Imagined contributors, materials, and activities
Sell	Imagined customers
Financial tally	Imagined or estimated revenues and costs

In Table 2-2, the evolving definition of opportunity is presented, illustrating how it has changed over time. The digital technology perspective is not included in these definitions.

Table 2-2 Redefining entrepreneurial opportunity from 1982 to 2018

ERA	References
Before www (- 1989) industrial era	
‘those situations in which new goods, services, raw materials, and organizing methods can be introduced and sold at greater than their cost of production’	(Casson, 1982; Shane and Venkataraman, 2000, p. 220)
After invention of www, before mobile apps (1991 – 2008/2010)	
‘an opportunity has the qualities of being attractive, durable, and timely and is anchored in a product or service which creates or adds value for its buyer or end user’	(Timmons, Spinelli and Tan, 1994)
‘1. New ideas or inventions that may or may not lead to the achievement of one or more economic ends that become possible through those ideas or inventions; 2. Beliefs about things favourable to the achievement of possible valuable ends; and, 3. Actions that generate and implement those ends through specific (imagined) new economic artefacts (the artefacts may be goods such as products and services, and or entities such as firms and markets, and or institutions such as standards and norms)’	(Sarasvathy <i>et al.</i> , 2010, p. 143)
Mobile apps, digital technology, digitalization era (2008/2010 -)	
‘We characterized <i>opportunities</i> as the discovery or creation of new means–ends relationships that can evolve from interactions between markets and environments’.	(Busenitz <i>et al.</i> , 2014, p. 4)
‘Entrepreneurial experiences begin within already organized organization of systems and knowledge configured around largely pragmatic interests with sustaining human life. Opportunity arises in a holding open of these systems through decisions that mark new ways. It is in this historically located way that the entrepreneur acts into the open, not towards a recognized opportunity. It is the acting itself that constitutes the opportunity, which is a process, not a thing.’	(Hjorth, Holt and Steyaert, 2015, p. 606)
on the actor - new venture idea nexus and is suggesting an alternative conceptualization of entrepreneurial opportunity by breaking it down into three parts as external enabler, new venture idea and opportunity confidence	(Davidsson, 2015, p. 675)
Opportunity is an umbrella concept. Opportunity is an ‘introduction of new products, services, or ways of doing business to better serve the needs of consumers in one or more markets. Contains the possibility for economic gain as well as the possibility for financial loss for the entrepreneur’.	(Wood and Williams, 2014, p. 575)
‘We define entrepreneurial opportunity as the propensity of market demand to be actualized into profits through the introduction of novel products or services’.	(Ramoglou <i>et al.</i> , 2017, p. 5)
Four essential elements ‘first, there is the <i>something</i> , i.e. that is the object of activity, in this case new goods, services, raw materials or organizing methods. Second, there is the <i>doing</i> of the something, in this case to be <i>introduced</i> , which comprises the activities, objects and people associated with production, distribution and sales / marketing, i.e. getting the something to the point or place where it is ready to be exchanged. Third, this something needs to be <i>sold</i> , which comprises other people who act as the other party to the exchange (buyers). Finally, there is the <i>financial tally</i> of the first three elements, whereby the income from the sale is compared against the costs of production’.	(Dimov, 2018b, p. 20)

2.1.2 How entrepreneurial opportunities come to exist

As opportunity is a central concept of entrepreneurship, the question of how entrepreneurial opportunities come to exist is of interest. The most cited paper on entrepreneurial opportunities (Shane and Venkataraman, 2000) uses the terms ‘discovery’ and ‘exploitation’ connected to opportunities in the following way: ‘Entrepreneurship is concerned

with the discovery and exploitation of profitable opportunities' (Shane and Venkataraman, 2000, p. 217). The study instigated a vibrant discussion concerning whether opportunities are recognised or identified (Ardichvili, Cardozo and Ray, 2003), discovered, or created or constructed (Alvarez and Barney, 2007; Suddaby, Bruton and Si, 2015) – or whether opportunities exist 'out there' or 'the entrepreneurial agency is the one creating the social structure of external reality' (Ramoglou and Zyglidopoulos, 2015, p. 72). In this active discussion of the source of opportunities, many attempts have been made to reveal the nature and source of opportunity (Berglund and Korsgaard, 2017; Davidsson, 2017; Matthew S. Wood, 2017; Matthew S Wood, 2017; Ramoglou *et al.*, 2017). Researchers use the terms 'forming' (Alvarez, Barney and Anderson, 2013) or 'creating' (Dimov, 2007; Welter, Mauer and Wuebker, 2016), as opposed to 'discovering' (Shane and Venkataraman, 2000) or 'recognising' (Baron, 2006; Kuckertz *et al.*, 2017) entrepreneurial opportunities.

'Opportunity recognition is characterized by being alert to potential business opportunities, actively searching for them, and gathering information about new ideas on products or services' (Kuckertz *et al.*, 2017, p. 81).

However, the literature on opportunity recognition (Baron and Ensley, 2006), identification (Ardichvili, Cardozo and Ray, 2003; Gaglio and Winter, 2017), and discovery (Kirzner, 1997) posits that opportunities are somehow recognised, identified, or discovered. A definition by Mason and Harvey (2013, p. 3) argues that 'only by looking at opportunity backwards from the vantage point of the unfolded – and already known – future it is possible to speak of discovery, recognition and identification of opportunities'.

Researchers are using the terms forming (Alvarez, Barney and Anderson, 2013) or creating (Dimov, 2007; Welter, Mauer and Wuebker, 2016), as contrary to discovering (Shane and Venkataraman, 2000) or recognizing (Baron, 2006; Kuckertz *et al.*, 2017) entrepreneurial opportunities of how these opportunities come to exist.

Opportunity recognition and creation are two different contingencies; depending on the context, one or the other is the dominant term (Sarasvathy, 2001). Additionally, the 'narrative' perspective on entrepreneurial opportunities (Steyaert, 1997; Hjorth and Steyaert, 2004; Garud, Gehman and Giuliani, 2014) suggests both discovery and creation are part of the process, and opportunities are created through a continuous interaction with in-

volved actors in the opportunity development process (Garud and Giuliani, 2013; Venkataraman *et al.*, 2013; Snihur, Reiche and Quintane, 2014; Garud, Gehman and Giuliani, 2016).

According to the 'actualisation' approach (critical realism), opportunity creation is a problematic term, as opportunities are neither discovered nor created, but rather exist as 'the non-actualised market conditions making possible the emergence of desirable outcomes' (Ramoglou *et al.*, 2017, p. 2). The critics of this actualisation approach (Berglund and Korsgaard, 2017) argue that the metaphor of a seed as an opportunity is inappropriate since the seed can only grow into a flower with time, but opportunity can become something emergent and unexpected due to social interaction. This unpredictability of human action and interaction is demonstrated in the case of a bank run. The critics urge that scholars should consider explanations that 'focus on empirically tractable social mechanisms that connect social action and interaction with relevant outcomes' and take into account the transformative character of entrepreneurship (Berglund and Korsgaard, 2017, p. 8).

Entrepreneurs are able to discover or recognise opportunities when they have prior knowledge to identify the opportunity and the cognitive ability to assess the opportunity (Shane and Venkataraman, 2000). They need prior knowledge of the markets, as well as how to serve markets and handle customer problems (Sanz-Velasco, 2006).

This research partly adopts the actualisation approach, which supports the belief that opportunities are not created, but rather that products or services are created by the activities and means of the entrepreneur(s) with relevant actors. The view that events that are not deductively predictable trigger opportunities that can come into existence through these events is adopted. For example, with regard to short message service (SMS), 'Serendipity would appear to have determined the present day texting phenomenon' (Taylor and Vincent, 2005, p. 76). Although SMS technology was originally designed for a different purpose, it became a major success with 3.6 billion global system for mobile communications (GSM) users in 2011 (Ahonen, 2011), not by creation but due to the activities of the users and means of developers.

2.2 Process of entrepreneurial opportunity development and venture creation

This research adopts the process view of entrepreneurship. The process view of entrepreneurship has been suggested by several researchers from different eras, as early as in the 1980s (Gartner, 1985) and again 30 years later (Steyaert, 2007; Alvarez, Barney and Anderson, 2013; McMullen and Dimov, 2013; Hjorth, Holt and Steyaert, 2015; Selden and Fletcher, 2015). Process studies focus on how and why things emerge, develop, or terminate over time (Langley *et al.*, 2013). The process view of entrepreneurship research is shifting towards ‘the processes used to form and exploit opportunities’ (Gartner, 1985; Bygrave and Hofer, 1991; Alvarez, Barney and Anderson, 2013, p. 301; Hjorth, Holt and Steyaert, 2015).

Moreover, the process view of entrepreneurship is more suitable compared to the variance theory approach when explaining ‘what entrepreneurs do under genuine uncertainty’, and ‘a process approach to entrepreneurship research may reveal predictable patterns and events that variance-oriented studies would otherwise miss’ (McMullen and Dimov, 2013, p. 1507). The difference between variance theory and process theory is that variance theory explains strategic change using different attributes and the extent to which they affect the strategic change, whereas process theory explains strategic change by showing how strategy changes over time when events, activities, and choices moderate the process (Mohr, 1982; Langley, 1999).

The selection criteria used to guide the literature review of the entrepreneurial venture creation process (Table 2-3) was to examine the following themes:

- Entrepreneurial processes and venture creation process models
- Concepts related to entrepreneurial processes
- Entrepreneurial growth models and stages models
- Relevant opportunity-related processes and concepts

These themes were chosen to find models from the entrepreneurial literature because this research adopts the process view of entrepreneurship, process theory explains how events and activities moderate the process (Mohr, 1982; Langley, 1999), and the research focus of entrepreneurship towards ‘the processes used to form and exploit opportunities’

(Gartner, 1985; Bygrave and Hofer, 1991; Alvarez, Barney and Anderson, 2013, p. 301; Hjorth, Holt and Steyaert, 2015).

Criteria of the literature review articles were:

- Published in an academically valued journal (SCImago, 2017; Harzing, 2018)
- Considered an influential entrepreneurship model (von Briel, Recker and Davidsson, 2018)
- Contains a high number of citations (Google Scholar)
- Has a relatively high number of articles reviewed (from 32 to 210) or a long time period covered (20 years)

The literature review aims to synthesise the existing entrepreneurial process models in order to find definitions (Webster and Watson, 2002), build a theoretical framework, and identify research gaps. The review presents the concepts in an author-centric manner and in chronological order. Illustrations of the relevant models from the literature review with the concepts of the models, served as basis for the framework of this study.

Table 2-3 Articles studied for the literature review of entrepreneurial venture creation process

Author(s)	Concept(s) studied	Nature of the article	Conclusions of study/ concepts used for framework of this study
(Bhave, 1994)	Process model of entrepreneurial venture creation, sequential model	27 entrepreneurs starting business, New York, physical products, manufacturing (Google Scholar #cit.=1215)*	process model can serve as a useful road map
(Bruyat and Julien, 2001)	Individual – New Value Creation model	(Google Scholar #cit.=1381)*	new value creation
(Shane and Venkataraman, 2000; Shane, 2003)	entrepreneurship and opportunities, how opportunities come to exist, how people discover and exploit opportunities, what modes of action are used to exploit these opportunities, sequential stage model	theoretical, largely quoted (Google Scholar #cit.=13 092+4739)*	theoretical framework of entrepreneurship using the concepts of the existence, discovery, and exploitation of entrepreneurial opportunities
(Sarasvathy, 2001, 2009)	effectuation theory	theoretical (Google Scholar #cit.=1657+4170)	focus on controllable aspects of unpredictable future, new markets created through alliance and other cooperative strategies

Author(s)	Concept(s) studied	Nature of the article	Conclusions of study/ concepts used for framework of this study
(Ardichvili, Cardozo and Ray, 2003)	opportunity identification and development model	theoretical (Google Scholar #cit.=2 963)	Antecedents, recognition, development and evaluation of opportunity, abortion, venture formation, type of opportunity
(Gilbert, McDougall and Audretsch, 2006)	new venture growth	review of 48 empirical articles published in foremost management and entrepreneurship journals (Google Scholar #cit.=644)	rich array of factors, ranging from characteristics of the entrepreneur, to access to resources such as human capital and finance, explaining why some ventures grow more than others, how to grow (internally or externally) and where to grow (domestically or internationally)
(Sarason, Dean and Dillard, 2006; Mole and Mole, 2010)	structuration model, entrepreneurship as the nexus of individual and opportunity	theoretical, Google Scholar #cit.=660+54)	structuration model of entrepreneurial venture creation
(Alvarez and Barney, 2007; Alvarez, Barney and Anderson, 2013)	entrepreneurial opportunity discovery and creation, forming and exploiting opportunities, opportunity creation theory	theoretical (Google Scholar #cit.=1 763+)	opportunities are emergent, creation is iterative and evolutionary
(Dimov, 2007, 2011; McMullen and Dimov, 2013)	opportunities emerge through the continuous shaping and development of (raw) ideas that are acted upon, opportunity development as a social, learning process	theoretical (Google Scholar #cit.=512+340+281)	entrepreneurship as a journey, entrepreneurial learning
(Steyaert, 2007; Hjorth, Holt and Steyaert, 2015)	entrepreneurial process, emergence (complex & chaos theories), creative process view, entrepreneurship as sense making process (interpretive and phenomenological attempts), social constructionist approaches (narrative approach), the pragmatist and practice-based perspectives (effectuation)	review of process theories, 20 years of entrepreneurship studies (Google Scholar #cit.=552)	'entrepreneuring', creative process theory view, used for studying entrepreneurship from emergence, or entrepreneurial becoming positions
(Short <i>et al.</i> , 2010)	opportunity concept and the processes surrounding it	review article, 40 conceptual and 28 empirical articles (Google Scholar #cit.=660)	dynamic process, more complex theory building, empirical modelling

Author(s)	Concept(s) studied	Nature of the article	Conclusions of study/ concepts used for framework of this study
(Levie and Lichtenstein, 2010)	entrepreneurial growth and stages theory	review article, 104 articles of new venture growth stages process model, critics of stages model, suggestion for a framework	dynamic states, most efficiently/ effectively match internal organizing capacity with the external market/ customer demand, any number of states, adaptive process, retaining the sustainability of a business model, emergent outcomes
(Hansen <i>et al.</i> , 2011)	definitions of entrepreneurial opportunity and opportunity related processes	review article, 56 articles, 49 conceptual definitions and 32 operational definitions	
(Moroz and Hindle, 2012)	entrepreneurship as a process, need for collective effort toward clearer understanding of what means to study and practice entrepreneurship	review article, 32 models and researchers studied	no unified theoretical approach, , context <i>really</i> matters: entrepreneurial process cannot be abstracted from its contextual setting, “how” of entrepreneurship in entrepreneurial process
(Davidsson and Gordon, 2012; Davidsson, 2015)	‘opportunity in relevant ways’, new venture creation process	review article, 210 articles, suggestion for framework 83 journal articles, PSED data	opportunity: external enables, new venture ideas and opportunity confidence, actions, outcomes
(Selden and Fletcher, 2015)	entrepreneurial artefacts, entrepreneurial journey, the emergent outcomes of the entrepreneurial journey in terms of the design of entrepreneurial artefacts at different levels in an emergent hierarchical system	theoretical, case Republic of Tea	entrepreneurial artefacts, business model, entrepreneurial journey
(Vogel, 2016)	from venture idea to venture opportunity	review of 12 most influential typologies on opportunities, suggestion for a framework	venture opportunity development and exploitation, external and individual factors, shape, refine customer need, resources and capabilities, customer segment, venture idea, venture concept and venture opportunity, pivoting, trigger

*Google Scholar citations by 20 December 2018

** Included in this research

The entrepreneurial opportunity development process is not the same for all kinds of ventures, and the processes used to form opportunities can vary systematically (Alvarez, Barney and Anderson, 2013). The creation process for innovative versus imitative ventures is different (Samuelsson and Davidsson, 2009).

The effectuation processes 'take a set of means as given and focus on selecting between possible effects that can be created with that set of means' (Sarasvathy, 2001, p. 2001, 2009). The idea of effectuation process is, how to create something when it does not yet exist and how to create new markets through alliances and other types of cooperative strategies.

Ardichvili, Cardozo, and Ray (2003) argue that the development process of opportunity is 'cyclical and iterative', and during the process, the entrepreneur repeatedly conducts evaluations of the venture at different stages of development. The evaluations can lead to 'recognition of additional opportunities of adjustments to the initial vision' (Ardichvili, Cardozo and Ray, 2003, p. 106). The opportunity development process (Ardichvili, Cardozo and Ray, 2003, p. 109) is described as 'a continuous, proactive process essential to the formation of a business'.

In the early stages of venture idea generation and interpretation, the development processes 'are likely situated in a particular context: executing a particular task, performing a regular job' (Dimov, 2007, p. 722). Opportunity development is seen as a social learning process. Dimov (2011) emphasises the need to view entrepreneurship as a journey, circumstantial to time and space, and explains how each event is necessary to explain that outcome and how the entire chain of events is the explanatory unit (McMullen and Dimov, 2013, p. 1488).

In a review of 20 years of entrepreneurial studies by Steyaert (2007), a large number of studies were discussed and grouped under the following themes: emergence in order creation of complex and chaos theories, creative process view entrepreneurship as a sense-making process in interpretive and phenomenological studies, narrative approach in social constructionist approaches, effectuation in pragmatist and practice-based perspectives, actor-network theory, radical process philosophy, and social ontology of becoming. The study suggests 'entrepreneurship' as a creative process theory view, which could be used to study entrepreneurship from emergence or entrepreneurial becoming positions, rather than from the equilibrium view with normative, linear process with cycles of growth. Short et al. (2010, p. 23) call for research on entrepreneurship to understand the nature of opportunities and their causes and effects, as well as analytical techniques that

allow for the testing of dynamic process, more complex theory building, and empirical modelling.

Levie and Lichtenstein (2010, p. 336) claim that the stages models, lifecycle theories, and entrepreneurial growth do not precede the actual development of firms, instead they are 'clear but misleading roadmaps that create an illusion of certainty about the path ahead'. Because the opportunity development and exploitation process of start-up ventures is a complex and dynamic process that seldom follows the linear pattern, with different stages of venture creation process in predetermined manner, they propose the dynamic state model, which views business organisations as 'open, complex adaptive systems, that operate in disequilibrium conditions' (Levie and Lichtenstein, 2010, p. 332). In a later study, Lichtenstein (2015) builds on the concept of emergence, claiming that emergence is a process that generates an emergent outcome. That emergence in entrepreneurship follows a process or pattern which he says is more predictive of start-up success than behavioural content and that most instances have no influence in the dynamic system but a few instances have substantial leverage.

There is 'no agreement among entrepreneurship researchers on major concepts used to define and operationalise the processes in question' (Ardichvili, Cardozo and Ray, 2003, p. 107). Moroz and Hindle (2012) also conclude that no unified theoretical entrepreneurial process model exists which is both generic and distinct. They found the study of practical implications to be in a minority of entrepreneurship process studies, while many studies from a theoretical perspective exist. Moroz and Hindle (2012, p. 811) also emphasise the importance of context in the entrepreneurial process research, stating that 'entrepreneurial process cannot be abstracted from its contextual setting'.

The actor and external enabler theory (Davidsson, 2015) suggests that an actor is at one end of the nexus, and the new venture creation process is at the other end. New venture creation includes idea identification, opportunity confidence, action, and outcomes.

The model of dynamic and iterative framework of entrepreneurial process (Vogel, 2016) looks at the evolution of a venture from first insight to exploitation and includes insights from creativity and innovation management. This holistic model includes three phases: trigger, venture idea generation, and venture opportunity development and exploitation.

‘Trigger’ refers to the reasons for venture idea generation – resource push, market pull, and desire to start (Vogel, 2016, p. 9) – and emphasises the internal and external factors. The triggered venture idea is defined ‘as a preliminary and mostly incomplete mental representation of the concept for a potential future venture’ (Vogel, 2016, p. 8).

In the incubation phase, the venture concept is shaped and refined by customer needs, resources and capabilities of the venture, and customer segment. After the incubation phase, an evaluation phase takes place. Opportunity development and exploitation also occurs in this third phase and involves incubation, evaluation, and possibly pivoting. Pivoting is a term adopted from other fields; for example, in basketball, pivoting means one foot stays on the ground while the other moves. The definition of pivoting adopted by this research is ‘*a substantive change to one or more of the nine business model canvas components*’ (Blank, 2014), see Section 3.1.1 for Business Model Canvas.

A conceptual study of venture creation process and digital artefacts lists eight influential entrepreneurship theories (von Briel, Recker and Davidsson, 2018, p. 280), all of which are included in this research. Three groups of researchers (Bhave, 1994; Shane and Venkataraman, 2000; Bakker and Shepherd, 2017) proposed a three-phase conceptualisation of the entrepreneurial process. The process begins with (1) identification (filtration, prospecting) of the opportunity phase; (2) the evaluation (refinement, developing) of the opportunity phase; and (3) the exploitation of the opportunity phase (in earlier, pre-digital models, this was physical creation). The conceptualisations of entrepreneurial processes are simplifications of the original models. The last model (Bakker and Shepherd, 2017) is based on the mining industry, and the other models are more general in nature.

The notion of a cyclical entrepreneurial process is suggested by several researchers (Ardichvili, Cardozo and Ray, 2003; Zahra, 2008; Snihur, Reiche and Quintane, 2014; Lichtenstein, 2015), and emergence is also found to occur in cycles (Lichtenstein, 2015). Temporal sequencing of the development cycles (Snihur, Reiche and Quintane, 2014, p. 29) is said to ‘likely affect the speed of opportunity development’. This cyclical nature of entrepreneurial processes is adopted by this research.

Many researchers use the term ‘exploiting opportunities’ (Shane and Venkataraman, 2000; Eckhardt and Shane, 2003; Alvarez and Barney, 2007; Kuckertz *et al.*, 2017). This

‘Opportunity exploitation is characterized by developing a product or service based on a perceived entrepreneurial opportunity, acquiring appropriate human resources, gathering financial resources, and setting up the organization’ (Kuckertz *et al.*, 2017, p. 82).

The exit phase was discussed in some entrepreneurial process models; this is the phase when the entrepreneurial process ends. The entrepreneurial process is seen as incomplete without exit (DeTienne, 2010, p. 203). Exit is defined as

‘the process by which the founders of privately held firms leave the firm they helped to create; thereby removing themselves, in varying degree, from the primary ownership and decision-making structure of the firm’ (DeTienne, 2010, p. 203).

Exit strategies can be developed early in stages of the venture creation process, and they likely affect the later decisions and behaviors (Detienne, Mckelvie and Chandler, 2015). The outcomes of entrepreneurial exit on the firm level can be bankruptcy, closure, initial public offering (IPO), acquisition, independent sale, management buyout (MBO), employee buyout (EBO), or family succession (Wennberg and DeTienne, 2014). The exit and the exit strategy differ according to the phase of the company, and because the outcomes vary greatly, an exit strategy should be in place (Wennberg and DeTienne, 2014; Detienne, Mckelvie and Chandler, 2015).

2.2.1 Entrepreneurial artefacts

The development of opportunities involves the concept of artefacts (Sarasvathy, 2003; Venkataraman *et al.*, 2012, 2013). Opportunities can be portrayed as artefacts arising from the actions and interactions of entrepreneurs (Venkataraman *et al.*, 2012).

A study of entrepreneurial artefacts show different mechanisms of developing entrepreneurial artefacts (Venkataraman *et al.*, 2012), such as bricolage (Baker and Nelson, 2005), effectuation (Sarasvathy, 2001), pattern recognition (Baron and Ensley, 2006), and transformation in the case of creating new markets (Dew *et al.*, 2011). The science of artificial theory (Simon, 1996) views entrepreneurship as a science of the artificial (Sarasvathy, 2003; Venkataraman *et al.*, 2012), where artefacts are described as ‘objects and phenomena in which human purpose as well as natural law are embodied’ (Simon, 1996, p. 3). A more practical description of human artefacts is as follows:

‘Human artefacts are emergent outcomes of practical activities, such as engineering, medicine, business, architecture and painting, which are purposefully designed for an uncertain future in the context of uncertain contingencies’. (Selden and Fletcher, 2015, p. 605)

The critical view of the process theory explaining the venture creation process claims, that the process perspective does not include in their models entrepreneurial events in relation to the entrepreneurial journey as a unit of analysis (Selden and Fletcher, 2015). The model shows the entrepreneurial journey as an 'emergent hierarchical system of entrepreneurial artefact-creating processes' that is based on the complex science of the emergence of entrepreneurial artefacts (Selden and Fletcher, 2015, p. 603). The model of the artefact creation process has some similarities with Levie and Lichtenstein's model; both models include similar concepts: business model; resources as capabilities; entrepreneurial practices (also called activities or, later in this research, actions); and new supply-demand relationships, which are also referred to as supply chain collaborations or inter-firm collaboration strategies. Levie and Lichtenstein (2010) do not use the term 'artefact' in their model.

The emergent artefact creation process (Selden and Fletcher, 2015) suggests that the artefact interaction and emergent system is hierarchical with six levels according to different subsystems: entrepreneur sense-making, entrepreneur-stakeholder, entrepreneurial firm, entrepreneurial market system, firm cluster or network system, and socio-cultural system. The study uses the story of the Republic of Tea (Ziegler, Rosenzweig and Ziegler, 1994) as an example to test their model. The theory is interesting but may need more validation because it is a hierarchical model.

Venkataraman et al. (2012) suggest a way forward with the entrepreneurial artefact discussion, stating that because opportunities are made and found, researchers should be moving beyond new combinations (Joseph Alois Schumpeter, 1934) to include transformations as a central concept, focusing on the actions and interactions of entrepreneurs and their stakeholders and viewing entrepreneurship as a method.

2.2.2 Entrepreneurship and business models

The business model concept has become essential, if assessed by the number of academic articles published (Zott, Amit and Massa, 2011), by bestselling book interest (Lewis, 1999; Osterwalder and Pigneur, 2010), or by the number of business articles published (Johnson, Christensen and Kagermann, 2008; Sinfield *et al.*, 2012). Business modelling is said to be 'the managerial equivalent of the scientific method – you start with a hypothesis,

which you then test in action and revise when necessary' (Magretta, 2002, p. 5), and 'for start-ups, any act of entrepreneurship means the choice of a business model' (Foss and Saebi, 2016, p. 220).

Business model research has been present in scientific discussions for over 50 years (Wirtz *et al.*, 2016). The business model concept does not have a universally accepted definition; instead, it is defined in many ways (Al-Debei and Avison, 2010; Zott, Amit and Massa, 2011), including as 'a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets' (Morris, Schindehutte and Allen, 2005, p. 707), 'a system-level concept, centered on activities, and focusing on value' (Zott, Amit and Massa, 2011, p. 1037), and 'management's hypothesis about what customers want, how they want it, and how the enterprise can organise to best meet those needs, get paid for doing so, and make a profit' (Teece, 2010, p. 172).

The business model concept is central to entrepreneurship research, as one of the definitions of business models shows that business models '(George and Bock, 2011, p. 99), and further

'The cognitive processes associated with opportunity identification and enactment focus may or may not incorporate firm level strategic thinking, but the firm formation decision is based on the enactment of an opportunity through an explicit or implicit business model. [...] The business model is therefore a core building block of the entrepreneurial enactment process' (George and Bock, 2011, p. 111).

In business model research, the focus is shifting from what the firm's resources are to how to use them. In addition, the question the viability (McGrath, 2010) of the business model, and the issue of sustainable business models (Upward and Jones, 2016) with ontological questions of how to define success are relevant.

The following section presents a summary of the literature review of entrepreneurial processes and opportunity development processes.

2.2.3 Summary of entrepreneurial venture creation process models

According to the earlier literature, the entrepreneurial opportunity identification, development, and exploitation process is dynamic, cyclical, and iterative in nature. Opportunities 'are developed through repetitive interactions between entrepreneurs and other actors, such as customers, partners, or regulators' (Snihur, Reiche and Quintane, 2014, p.

12065) and lead to emergent opportunities (Alvarez, Barney and Anderson, 2013). Entrepreneurial artefacts are developed during the opportunity development and exploitation process, such as the business model, resources as capabilities, entrepreneurial practices or activities, new supply-demand relationships (also called supply chain collaboration), or inter-firm collaboration strategies. The venture idea is evaluated along the entrepreneurial journey and can lead to alterations, pivoting (Vogel, 2016), formation, or abortion of the venture idea. The question of the driving force or trigger for action is explained by the founders' logic or opportunity tension, referring to the tension between stability and need for change (Levie and Lichtenstein, 2010) or by the entrepreneurs' individual-level factors (Ardichvili, Cardozo and Ray, 2003; Vogel, 2016).

The term 'creation' was originally used in this research but later changed to 'identification' when the actualisation approach (Ramoglou, Tsang 2017) was adopted. Identification, in this study, includes the discovery and recognition of the opportunity. The term 'opportunity development' refers to a dynamic and iterative process during which opportunity is repeatedly translated and transformed by relevant actors. The term 'exploitation' refers to developing a product or service based on a perceived entrepreneurial opportunity, acquiring appropriate resources, and setting up the organisation. The evaluation of the opportunity is included in the process.

For this research, an operable terminology is needed to describe the phenomenon which addresses the processes used to create, identify, and recognise opportunities; to develop, evaluate, and refine opportunities; and to exploit opportunities. Thus, the terms opportunity identification, evaluation, development, and exploitation are adopted by this research, which views entrepreneurship as 'a continually unfolding process, not necessarily tied to any specific outcome' (Packard, 2017, pp. 536–537).

The characteristics, points of view, and concepts included in the process of identifying, evaluating, developing, and exploiting the opportunity are listed below. From the entrepreneurship research literature, it has been learnt that:

- Entrepreneurial venture creation process starts with a trigger, which generates the venture idea defined 'as a preliminary and mostly incomplete mental representation of the concept for a potential future venture' (Vogel, 2016, p. 8);

- Prior knowledge, social networks, entrepreneurial alertness, and personality traits are antecedents of the process (Ardichvili, Cardozo and Ray, 2003);
- There is no single, unified model of entrepreneurial processes (Moroz and Hindle, 2012);
- Process is not a linear stage model (Levie and Lichtenstein, 2010);
- Process is dynamic, iterative, and cyclical in nature (Ardichvili, Cardozo and Ray, 2003; Levie and Lichtenstein, 2010; Short *et al.*, 2010); ‘iterative and of trial and error, that fail and succeed to produce novel products and services’ (Alvarez, Barney et al. 2013, Mason, Harvey 2013); and process happens in development cycles (Snihur, Reiche and Quintane, 2014);
- New markets can be created through alliances and other kinds of cooperative strategies (Sarasvathy, 2001);
- Entrepreneurial process can be divided into three phases – identification, evaluation, and exploitation (Shane and Venkataraman, 2000) – or a variation of this (Matthew S Wood, 2017; **Error! Reference source not found.**);
- McMullen and Dimov (2013) emphasise the need to view entrepreneurship as a journey rather than a process;
- Products or services are created by the activities and means of the entrepreneur(s) with relevant actors, and events that are not deductively predictable trigger opportunities that can come into existence (Snihur, Reiche and Quintane, 2014, 2016);
- Entrepreneurial process needs to be studied in context (Moroz and Hindle, 2012);
- An outcome of entrepreneurial activities are entrepreneurial artefacts (Ziegler, Rosenzweig and Ziegler, 1994; Selden and Fletcher, 2015), with one outcome being a business model (Levie and Lichtenstein, 2010);
- Entrepreneurial process includes business model development (activities, resources, and position) and generates an emergent outcome (Levie and Lichtenstein, 2010); and
- Exit is a phase; when the entrepreneurial process ends, the exit strategy is different according to the phase of the company, and as the outcomes varies greatly, an exit strategy should be in place (Wennberg and DeTienne, 2014; Detienne, Mckelvie and Chandler, 2015).

2.3 Characteristics and key concepts of digital context

By understanding the nature, richness and dynamics of their research contexts, entrepreneurship researchers can offer more creative and insightful explanations of important issues and why they matter to the discovery, creation and exploitation of opportunities that give birth to independent or corporate new ventures (Zahra, 2007, p. 451)

This section investigates the digital technology context and how digital technology and digitalisation bring more unpredictability and nonlinearity (Huang *et al.*, 2017; Nambisan, 2017) to entrepreneurial processes. The article selection for the general literature review was conducted by identifying the characteristics and key concepts of the digital context (see **Error! Reference source not found.**). The digital perspective includes concepts from three areas of science: entrepreneurship as digital entrepreneurship, information systems

as the characteristics and concepts of digital technology, and innovation management research as digital innovation (see also Figure 1-1). Digital entrepreneurship is discussed in Section 2.4 and digital innovation in Section 2.5.

The reasons causing this more unpredictability and non-linearity change in the landscape for entrepreneurial actions include the pace of change (Allison *et al.*, 2005); the disruption of industries (Mackenzie, 2015) as ‘opportunities to substitute digital platforms for physical world ecosystems catalyse convergence’ (Report, 2016, p. 21); the new ways to create value from data, as ‘personal data is to the tech world what oil is to the fossil fuel industry’ (Tarnoff, 2017); and the rise of digital platforms (Wladawsky-Berger, Kenney and Zysman, 2016) and cloud computing services (Benlian *et al.*, 2018). All these factors are shifting the way society and economy work, and this has a fundamental effect on how entrepreneurs create new ventures.

To understand how the digital technology context is affecting entrepreneurial processes, the layered, modular architecture of digital technology is studied first, followed by the characteristics of digital technology and the key concepts within the digital context.

2.3.1 Layered modular digital architecture

Digital architecture needs to be studied in detail, in order to understand the fundamental differences between the digital and physical worlds, the concepts and ‘organizing logic’ (Yoo, Henfridsson and Lyytinen, 2010) in a digital context, and how these factors affect entrepreneurial processes. Digital technology consists of devices, networks, services, and content (Yoo, Henfridsson and Lyytinen, 2010) and can be viewed as combinations of information, computing, communication, and connectivity technologies (Bharadwaj *et al.*, 2013). The speed of the evolution of digital technology is clearly seen in how the hardware and software environments are in a ‘constant state of flux’ (Allison *et al.*, 2005, p. 368); for instance, a new version of a computer, mobile device, or operating system (OS) had a cycle of five years a decade ago, but now the cycle can be calculated in months (every six months for iPhone) and in years (roughly every two years for laptops, depending on the manufacturer). Digital technology devices, networks, services, and content are orchestrated by *digital architecture*, which has corresponding layers for each area.

The goal of modular architecture is to reduce complexity and increase flexibility (Yoo, Henfridsson and Lyytinen, 2010) so that different ‘modules’ can act as substitutions for components. In layered modular architecture, a component requires little product-specific knowledge, meaning that it can be used in ways that were previously unknown.

2.3.2 Characteristics, definitions, and categories of digital technology

The fundamental property of digital technology is the *homogenisation of data*. This digitisation means ‘any digital content (audio, video, text, and image) can be stored, transmitted, processed, and displayed using the same digital devices and networks’ (Yoo, Henfridsson and Lyytinen, 2010, p. 726). As the internet is *generative*, it is ‘built to be open to any sort of device: any computer or other information processor could be part of the new network so long as it was properly interfaced’ (Zittrain, 2006, p. 1976). The generative nature of the internet ‘allows individuals, groups, and organizations to co-create services, applications, and content’, and thus the ‘outcome has been a hitherto unimaginable variety of new services: search, e-commerce, social networking, information sharing and pooling, gaming, video production and music distribution’ (Tilson, Lyytinen and Sørensen, 2010, p. 760).

The concept of *convergence* initially meant ‘technological integration of print, telecommunications and broadcasting systems with firm-level integration of publishers, telephone companies, cable TV operators, and broadcasters’ (Mueller, 1999, p. 11). Digital convergence development has been ‘fast and furious’, from Japanese NEC corporation’s vision in 1977 (Yoffie, 1996) to Sculley’s info industry in 2001, and today with smartphone technology converging telecommunications and photography. A study of trends in technological convergence (Gauch and Blind, 2014) shows that convergence is happening in various technological sectors. This digital convergence can be seen when two previously separate industries are combined (e.g., software development and telecommunications in the case of Skype) (Yoo, Boland Jr, *et al.*, 2012). The unique character of internet, the network of networks, and the redistributed ownership of control, compared to physical assets, are creating new opportunities is described in the following quote:

‘The Internet itself is but a network of connected networks tied together by its core protocols and is oblivious to the services and other platforms, like the World Wide Web, that it supports. This unique property has had the disruptive effect of redistributing control away from the owners of the physical assets. Rather, as noted individuals, groups, or organizations can now co-create services and applications limited only by their

own abilities to envision desirable properties, to succeed in development, and to enrol others'. (Tilson, Lyytinen and Sørensen, 2010, p. 752)

In addition to the previously mentioned properties, seven characteristics differentiate digital technology from earlier technologies: digital technology is programmable and re-programmable, editable, interactive, combinatorial, interoperable, self-referencing, and distributed (Yoo, Henfridsson and Lyytinen, 2010; Kallinikos, Aaltonen and Marton, 2013; Henfridsson, Mathiassen and Svahn, 2014; de Reuver, Sørensen and Basole, 2018). In order to understand concepts like digital artefacts and the nature of digital entrepreneurial process, these seven characteristics are discussed in more detail in Table 2-4. The 'characteristic' column of Table 2-4 was developed by the researcher

This study uses the definition of digital technologies as 'platforms, infrastructures or artefacts that use the power of computing on ubiquitous public networks' (Zaheer, Breyer and Dumay, 2019, p. 2).

Table 2-4 Seven characteristics of digital technology

Characteristic	Explanation	References
<i>programmable and re-programmable</i>	re-programmability allows a digital device to perform functions, which reprogram the data (calculating distances, word processing, video editing, and web browsing), this is not possible with physical objects	(Yoo, Henfridsson and Lyytinen, 2010; Yoo, Boland Jr, <i>et al.</i> , 2012)
<i>editable, you can create and update</i>	possibility to continuously modify digital artefacts 'editability is built into the object in the form of regular or continuous updating of content, items, or data fields, as is the case with digital repositories of various kinds whose utility is closely associated with constant updating (e.g., blogs or wiki pages, transaction or booking systems, currency exchange systems)'	(Kallinikos, Aaltonen and Marton, 2013, p. 358; von Briel, Recker and Davidsson, 2018, p. 292)
<i>interactive</i>	interactive means people can activate functions embedded in the object, so that they can make use of digital artefacts by interacting with the functions and affordances they present	(Kallinikos, Aaltonen and Marton, 2013, p. 353; Gustavsson and Ljungberg, 2018, p. 6)
<i>combinatorial, re-combinability</i>	re-combinability means 'the possibility to combine digital artefacts to create new artefacts'	(von Briel, Recker and Davidsson, 2018, p. 292)
<i>interoperable</i>	digital artefacts can be connected, and thereby become interoperable, also digital artefacts can be created to manipulate other digital artefacts	(Kallinikos, Aaltonen and Marton, 2013)
<i>self-referencing</i>	means digital innovation requires the use of digital technology (computers, smart phones, tablets)	(Yoo, Henfridsson and Lyytinen, 2010, p. 729)
<i>distributability</i>	means the possibility to distribute digital artefacts across sources and institutions and that digital artefacts are borderless and that borders must be maintained technologically	(Kallinikos, Aaltonen and Marton, 2013; von Briel, Recker and Davidsson, 2018, p. 292)

2.3.3 Digital artefacts

Digital technology enables the creation of digital artefacts or objects which have new and different characteristics compared to physical objects. Digital artefacts are described having a “dubious ontology”, meaning ‘they do not easily lend themselves to the kinds of criteria that we normally apply to perceive and identify physical objects’ (Allison *et al.*, 2005; Ekbja, 2009, p. 2554). Traditional products, services, or processes are (1) physically manufactured products (e.g., car, table, printed book, printed photograph); (2) analogical (i.e., analogical versus digital) products (e.g., vinyl record, video home system VHS videotape) (Koch and Windsperger, 2017, p. 4); (3) services with physical attendance (e.g., hair-dresser, doctor, tailor); or (4) physical processes (e.g., analogue TV broadcasting and film production). Examples of digital services are video on demand and digital imaging.

Contrary to a physical object, ‘a digital object cannot be perceived directly by human observers; a digital object is a bit stream: a series of zeros and ones which, when taken together, encode information in a particular format’ (Allison *et al.*, 2005, p. 368). Examples of digital artefacts include the internet, digital videos, computer files, software bugs, Wikipedia, blogs, webpages, and databases (Kallinikos, Aaltonen and Marton, 2013). Digital artefacts or objects are ‘intentionally incomplete and perpetually in the making’ (Kallinikos, Aaltonen and Marton, 2013, p. 357), such as websites and mobile applications; they are not finished objects but rather edible and re-constructible ones. Digital artefacts can be part of a physical product (Porter, Heppelmann and Porter E. Michael, 2014) as ‘stand-alone software/hardware component on a physical device or, as is increasingly evident, part of a broader ecosystem of offerings that operate on a digital platform’ (Nambisan, 2017, p. 4).

Digital artefacts are re-combinable, editable, and distributable (von Briel, Recker and Davidsson, 2018). Being editable means they can be edited, modified, deleted, or combined with new elements (Kallinikos, Aaltonen and Marton, 2013); they lack the stability and adequacy of traditional objects and could be seen as quasi-objects (as in open-source software development, Linux) (Ekbja, 2009). In addition, digital artefacts are interactive, can be accessed and modified by other digital objects, and are distributed – meaning they are

borderless and that borders must be maintained technologically – and ‘artefacts such as files, images, and films or videos are fluid and editable, often embedded in complex, distributed, and shifting digital environments’ (Ekbia, 2009; Kallinikos, Aaltonen and Marton, 2013, p. 358). This research adopts the definition of digital artefacts provided by Nam-bisan (2017, p. 3) as ‘a digital component, application, or media content that is part of a new product (or service)’ and as part of a platform (Zaheer, Breyer and Dumay, 2019).

Information system designers have exploited opportunities to ‘create families of complex artefacts by developing and recombining modular components’ (Baldwin and Woodard, 2008, p. 19). In an illustration of the layered modular architecture of digital technology (Yoo, Henfridsson and Lyytinen, 2010, p. 729), the characteristics of digital artefacts are presented on a continuum. Many artefacts are in the middle of this continuum, for example the digital camera and Internet of Things (IoT) -type products (Gubbi *et al.*, 2013).

The homogenisation of digital data has made it possible for loose coupling between components, which can be achieved via standardised interfaces and protocols, and which ‘makes digital artefacts decomposable and their components product-agnostic’ (von Briel, Recker and Davidsson, 2018, p. 281). In Table 2-5, the characteristics of physical products and digital artefacts (objects) are compared. The key features are gathered from the literature presented in earlier sections. For the sake of comparison, the introduction of dichotomy between digital and non-digital (conventional) business is presented. The degree of digitalization is discussed (Steininger, 2019) in several studies, see also Section 2.4.1.

Table 2-5 Comparison of characteristics of physical and digital artefacts (objects)

Key features	Physical (analogical) product/object	Digital artefact (object)	Author(s)
Can be perceived directly by human observer	yes	no	(Allison <i>et al.</i> , 2005)
Intentionally incomplete	no	yes	(Kallinikos, Aaltonen and Marton, 2013)
Stable/edible	stable	edible	(Kallinikos, Aaltonen and Marton, 2013; von Briel, Recker and Davidsson, 2018)
Distributed	no	yes	
Re-combinability	no	yes	(von Briel, Recker and Davidsson, 2018)
Interactive	no	yes	(Ekbia, 2009)
Borderless, borders must be maintained technologically	no	yes	(Kallinikos, Aaltonen and Marton, 2013)
Possible to access and modify by means of other digital objects	no	yes	(Kallinikos, Aaltonen and Marton, 2013)

Key features	Physical (analogical) product/object	Digital artefact (object)	Author(s)
Embedded in complex distributed and shifting digital environments	no	yes	(Yoo, Henfridsson and Lyytinen, 2010; Kalinikos, Aaltonen and Marton, 2013)
Product specific/agnostic components	specific	agnostic	(von Briel, Recker and Davidsson, 2018)
Fixed/fluid product boundary	fixed	fluid	(Yoo, Henfridsson and Lyytinen, 2010; Kalinikos, Aaltonen and Marton, 2013; Nam-bisan, 2017)

As new problems arise with digital objects and artefacts, for example the question of digital identity (Allison *et al.*, 2005) and digital security (Schneier, 2011), also new solutions for unforeseen problems are created with digital artefacts, such as digital ID for refugees (Roberts, 2017).

‘It (digital ID) will let millions of refugees and other without documents whip out a phone to quickly show who they are and where they came from. The tool, developed in part by Microsoft and Accenture, combines biometric data (like a fingerprint or an iris scan) and a new form of record-keeping technology, known as the blockchain, to create a permanent identity.’ (Roberts, 2017)

2.3.4 Digital economy, digital infrastructures, and cloud computing

The digital economy has given firms the potential to experiment with new business models and value creation mechanisms (Zott, Amit and Massa, 2011), and the level of connectivity between actors and ideas has increased dramatically (Casson, 1982). The always-on digital economy is built on various infrastructures: ecosystems, computer networking, payment applications, e-commerce, databases, networks, operating systems. There is not only one definition of digital economy; instead, there are many ways to describe it. The digital economy includes the internet, the network of connected, physical computers; world wide web, the pages online; e-commerce, of buying and selling goods and services online; and information technology, the use of computing technology for networking (IT) (Goldfarb, Greenstein and Tucker, 2015).

Digitisation (or digitalisation) is described as ‘the integration of digital technologies into everyday life. Digitization also means the process of making digital everything that can be digitized and the process of converting information into digital format’ (Fors, 2013). Digitisation has changed companies’ previous ways of doing business to a digital business strat-

egy (Bharadwaj *et al.*, 2013). Furthermore, digital economy, digitisation, and digital transformation are not about making business digital, they are 'about how technology changes the conditions under which business is done, in ways that change the expectations of customers, partners, and employees' (Kane, 2017). The implications of digitisation, Moore's law, and network effects include industry transformation, greater diversity of products and services, faster innovation cycles, new ways to market products, and creation of analytics-driven digital innovation opportunities (Fichman, Dos Santos and Zheng, 2014).

Moore's law explained:

'Gordon Moore accurately predicted in 1965 that the number of components on an integrated circuit (IC) would double every year for the next 10 years - a prediction that became known as Moore's Law' (Schaller, 1997, p. 55).

1. *Digital infrastructures*

Digital infrastructures, or information infrastructures, are defined as a 'shared, open, heterogeneous and evolving social-technical system' (Hanseth and Lyytinen, 2010, p. 1); 'digital technology tools and systems (e.g., cloud computing, data analytics, online communities, social media, 3D printing, digital makerspaces) that offer communication, collaboration, and/or computing capabilities to support innovation and entrepreneurship' (Nambisan, 2017, p. 4); or a 'collection of technological and human components, networks, systems, and processes that contribute to the functioning of the information system' (Henfridsson and Bygstad, 2013, p. 908). This research adopts the definition of digital infrastructure as 'the computing and network resources that allow multiple stakeholders to orchestrate their service and content needs' (Constantinides, Henfridsson and Parker, 2018, p. 381). Examples of digital infrastructures include the internet; data centres; open standards (USB, IEEE 802.11; Constantinides, Henfridsson and Parker, 2018, p. 381); cloud computing resources (Amazon Web Services AWS); social media; 3D printing; web data analytics; and artificial intelligence (Rippa and Secundo, 2018).

The basic idea of open standards is a set of rules that a Standard Setting Organisation (SSO; e.g. the Institute of Electrical and Electronic Engineers [IEEE], the European Telecommunications Standardisation Institute [ETSI], and the American National Standards Institute [ANSI]) creates, but commercial organisations are not fully complying to these standards (Krechmer, 2005). Open standards refer to rights to the standard available to economic actors (i.e., the rights to availability, maximise end-user choice, no royalty, no

discrimination, extension or subset and predatory practices) (Krechmer, 2005); and there is a call for sustainable digitalisation (Lundell and Gamalielsson, 2018). Institute of Electrical and Electronic Engineers (IEEE 802.11) is a standard for wireless local area networks (WLAN), and the term 'Wi-Fi' means the WLAN is using the IEEE 802.11 standard (Crow *et al.*, 1997).

The special characteristics of digital infrastructure, compared to traditional infrastructures, are 'its recursive nature, scalability, flexibility, and the varying substance of the material (data) being "transported"' (Tilson, Lyytinen and Sørensen, 2010, p. 752). Recursive nature in computer science means that infrastructures are capable of copying themselves.¹ Infrastructures being scalable means that 'their components can be upgraded or replaced (e.g., routers and transmission equipment) with relative ease and low cost' (Tilson, Lyytinen and Sørensen, 2010, p. 752). Flexibility means the digital infrastructure is 'open to the creation of any application or service making use of its lower level communications and storage capabilities' (Tilson, Lyytinen and Sørensen, 2010, p. 752).

A study of digital infrastructure evolution at a company level uses the case of the airline Norwegian, studying how the company created their digital infrastructure consisting of internet bookings, low-price calendar, digital customer communication, Norwegian bank, mobile portal, call Norwegian -service, and in-flight broadband services (Henfridsson and Bygstad, 2013, p. 915) over a period of nine years.

2. *Cloud computing and big data*

Cloud computing is transforming IT as a product, to IT as a service in a disruptive shift. This shift, which enables access to IT resources on-demand from any platform or device, offers an increasing number of services that are built within a shared pool of computing resources, which makes it possible to scale to growing computer demands (Benlian *et al.*,

¹ Recursion means "defining a problem in terms of itself". This can be a very powerful tool in writing algorithms. Recursion comes directly from Mathematics, where there are many examples of expressions written in terms of themselves. For example, the Fibonacci sequence is defined as: $F(i) = F(i-1) + F(i-2)$
<https://www.cs.utah.edu/~germain/PPS/Topics/recursion.html>

2018). Information technology has reduced the need to 'own physical infrastructure and assets' (Van Alstyne, Parker and Choudary, 2016, p. 6), and cloud computing services have made it possible for big data to be processed and analysed (Ibrahim Abaker Targio Hashem *et al.*, 2014) because web technology giants (e.g., Amazon) have resource surpluses in their vast data centres, and they offer cloud computing services to consumers and start-ups, who would otherwise not have access to such computational power (Briscoe and Marinos, 2009, p. 1). People rely on cloud services in their daily lives (Benlian *et al.*, 2018, p. 720) for messaging (e.g., WhatsApp), playing games online (e.g., GamingAnywhere), and managing businesses (e.g., SAP By Design).

Data have become the most important resource in digital economy. The claim 'data is the new oil' as a resource (Economist, 2017), has changed the ways to extract value. The data are being generated in huge amounts, and concepts like big data (Hopkins *et al.*, 2011) have emerged with analytics tools to handle the vast amounts of data generated. Moreover, user-generated content has become valuable, as in the case of Google and Facebook. Big data is defined as 'information assets characterised by such a high volume, velocity, and variety to require specific technology and analytical methods for its transformation into value' (De Mauro, Greco and Grimaldi, 2016, p. 122). As digital technology is generating data in various ways, big data analytic tools are improving (Franks, 2012). Regulators are thus implementing new laws such as the European General Data Protection Regulation (GDPR; Voigt and Von dem Bussche, 2017), which is an example of new regulations affecting the entrepreneurial venture creation process.

Cloud computing refers to 'both the applications delivered as services over the Internet and the hardware and systems software in the datacentres that provide those services' (Fox *et al.*, 2009, p. 1). Cloud computing services can be divided into four categories according to the layered architecture of the cloud: Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS), Infrastructure-as-a-Services (IaaS); and Hardware-as-a-Service.

Cloud computing services are accessible anywhere around the world and can be public or private (Bhaskar, Choi and Lumb, 2009). Public cloud services are offered via 'pay-as-you-go', and the services are scalable. The biggest public cloud computing services are Microsoft Azure, Amazon Web Services (AWS), IBM Cloud, Salesforce, and SAP (Evans,

2017). Examples of cloud computing services offered (Amazon Web Services, Inc., 2019) are virtual servers, scalable storage, relational databases, and migration of databases.

For the creation and growth of new digital ventures, the possibilities that digital infrastructures offer is vital. Easy-to-access digital infrastructures (Constantinides, Henfridsson and Parker, 2018, p. 382) with open standards (Krechmer, 2005) offer the possibility of flexibility and scalability (Tilson, Lyytinen and Sørensen, 2010); access to shared digital artefacts like common code bases (Ingram Bogusz and Morisse, 2018, p. 1178); and the ability of digital infrastructure to collect, store, and make digital data available across a number of systems and devices (Ingram Bogusz and Morisse, 2018, p. 1178). These cloud computing services are fundamental reasons for new venture creation opportunities in a digital context.

2.3.5 Digital platforms

The ongoing discussion of the meaning of platforms includes concepts such as the platform revolution (Parker, Van Alstyne and Choudary, 2016; Van Alstyne and Parker, 2017a), rise of the platform economy (Wladawsky-Berger, Kenney and Zysman, 2016) or platform capitalism (Langley and Leyshon, 2017), and the age of platforms (Evans and Gawer, 2016). All these terms indicate that platforms are revolutionary, in that they are changing the way economy and business are conducted. The role this digital platform phenomenon plays in entrepreneurial processes needs to be studied. The challenge of researching platforms lies in 'their distributed nature and intertwinement with institutions, markets and technologies' (de Reuver, Sørensen and Basole, 2018, p. 124).

Digital platforms are a new way to disrupt industries, and their contribution to the economy is an important one (Evans and Gawer, 2016). The significance of digital platform companies can also be viewed from the perspective of their share in the biggest companies by market value (Forbes, 2018), top 13 companies including Apple (US), Alphabet/Google (US), Microsoft (US), Amazon (US), Facebook (US), and Alibaba (China), which all can be considered as platforms.

Economists view platforms as 'special kinds of markets that play the role of facilitators of exchange between different types of consumers that could not otherwise transact with each other' (Gawer, 2014, p. 1240). Platform theory refers to platforms as multi-sided

markets or two-sided markets, where the consumer is on one side and the supplier of the product or service is on the other (Rochet and Tirole, 2003; Armstrong, 2006). A multi-sided platform (MSP), such as eBay, is both ‘a platform and a market intermediary, and distinct groups of consumers and complementary actors interact through these platforms’ (Boudreau and Hagiu, 2009, p. 188).

The term platform is not new; it has a rich history and many uses. *Plat* means flat or level, and *form* means shape or arrangement of parts (Tilson, Sørensen and Lyytinen, 2013, p. 4626). Platforms are divided into internal and external platforms (Gawer and Cusumano, 2014); internal platforms are not of interest to this research (e.g., supply chain platforms), but external industry platforms are (e.g., iPod, iPhone, iTunes, Facebook, LinkedIn, Twitter). The different types of digital platforms are digital (online) *marketplaces* (e.g., Amazon Market Place, eBay, Apple Store, Spotify, Alibaba); social media and user-generated *content* platforms (e.g., Facebook, YouTube, Twitter, Instagram, Google Search); economy sharing platforms (e.g., Uber, Airbnb); crowdsourcing platforms (e.g., TaskRabbit, Upwork); crowdfunding and peer-to-peer (P2P) lending platforms (e.g., Kickstarter, Indiegogo, GoFundMe); and digital payment platforms (e.g., PayPal, Stripe) (Langley and Leyshon, 2017, p. 11; Song, 2019) and *complementary innovation* markets (e.g., Apple iOS and Google Android) (Cennamo, 2019, p. 6).

Digital platforms can be defined as ‘a set of digital resources—including services and content—that enable value-creating interactions between external producers and consumers’ (Constantinides, Henfridsson and Parker, 2018, p. 381), or as ‘a set of shared digital services to host complimentary offerings including artefacts’ (Nambisan, 2017; Zaheer, Breyer and Dumay, 2019, p. 2). Both of these definitions are adopted by this research.

1. *Digital platforms as enabling innovation and venture development*

The importance of digital technology platforms in the creation of digital innovations is claimed to be ‘the central focus of the innovation’ (Yoo, Boland Jr, *et al.*, 2012, p. 1400). Digital platforms are enablers of innovation and development of digital products and services. These types of platforms, also called innovation platforms, offer technological building blocks as a foundation which innovators can use to develop complimentary products and services on top of the platform (Evans and Gawer, 2016). A more technological

definition is a ‘proprietary or open modular layered technological architecture that support efficient development of innovative derivatives, which are embedded in a business or social context’ (Kazan, Tan and Lim, 2014, p. 2).

An example of *layered modular architecture*, is presented using Apple Pay (Kazan *et al.*, 2016). The platform layers and respective modules are illustrated with examples of the services, transfers, and devices provided in each specific layer. Layered modular architecture makes it possible for a digitised product to simultaneously be a product and a platform (Yoo, Henfridsson and Lyytinen, 2010, p. 729). Digital platforms can open access for third-party developers by ‘, such as a application programming interface (API) and an app store, to allow complements to be developed and shared for the platform’ (Karhu, Gustafsson and Lyytinen, 2018, p. 479). Digital platforms are created on top of digital infrastructures (Constantinides, Henfridsson and Parker, 2018, p. 381).

Kazan *et al.* (2016, p. 54, 2018, p. 188) illustrate the relationship between digital infrastructure and digital platforms in value networks. Digital platforms are built by using the building blocks of digital infrastructures (e.g., internet, data centres, mobile phones).

2. *Venture scaling through network effect and user base*

A characteristic specific to digital ventures is the ability to scale in more levels than non-digital ventures. The reason for this scalability is the nature of digital technology; digital ventures are ‘built on software and data, and this gives them a potential to high and fast scalability’ (König *et al.*, 2018, p. 2). If the scaling of digital ventures is compared to the scaling of ventures of companies like Standard Oil, Sears, and General Electric (Chandler, 1990), it is qualitatively different (Huang *et al.*, 2017). The scaling of digital ventures is acquired by network effect and no physical assets are necessarily required. Moreover, the speed is much faster; thus, ‘some of the dominating technology firms such as Amazon and Google quickly reached a scale that took decades for industrial companies to accomplish’ (Huang *et al.*, 2017, p. 301).

It is argued that the driving force behind the internet economy today is the demand-side economies of scale (Van Alstyne and Parker, 2017a), also known as the network effect. The network effect happens when ‘the more users who adopt the platform, the more valuable the platform becomes to the owner and to the users, because of growing access to

the network of users, and often a set of complementary innovations' (Gawer and Cusumano, 2014, p. 417). In contrast to internal platforms, external platforms have the potential to create network effects.

The number of people using the solution (or application) is called the user base, and the speed with which the user base grows is 'the defining feature of scaling in digital ventures' (Huang *et al.*, 2017, p. 309). The difference between user base and customer base is that customers have already purchased but users have not necessarily (Schmittlein and Peterson, 1994; Huang *et al.*, 2017). Digital platforms grow in value with the flow of usage, which includes the joint value creation of users providing data and content. Platforms create a flow of data where the data are the critical resource (Van Alstyne and Parker, 2017a).

2.3.6 Digital business ecosystems

As digital disruption is creating increasingly digital ecosystems, it is seen as an opportunity but also as a threat for incumbent, non-digital industries (Weill and Woerner, 2015). Digital ecosystems are a new way to organize economic activities (Jacobides, Cennamo and Gawer, 2018). In the management literature, digital ecosystems and platforms are intimately related (de Reuver, Sørensen and Basole, 2018), and the term is inconsistently used, as a digital ecosystem is a 'network of companies and other institutions that is inter-linked by a common interest to create and sustain value around a digital platform' (Koch and Windsperger, 2017, p. 2). For clarity, digital ecosystems should be defined by whether the ecosystem is viewed as technical or organisational (business ecosystem); the technical ecosystem is the 'collection of complements (apps) to the core technical platform, mostly supplied by third parties', and in the organisational ecosystem, the 'collection of firms are interacting with a contribution to the complements' (de Reuver, Sørensen and Basole, 2018, p. 127).

Another way to define a digital business ecosystem is as 'a collective of firms that is inter-linked by a common interest in the prosperity of a digital technology for materializing their own product or service innovation' (Selander, Henfridsson and Svahn, 2013, p. 184). The reason for the ecosystem to exist is explained by the co-creation of value as 'a socio-

technical environment of individuals, organisations and digital technologies with collaborative and competitive relationships to co-create value through shared digital platforms’ (Senyo, Liu and Effah, 2019, p. 53), and ‘ecosystems provide firms with resources and are considered to be the playfield on which firms co-create value with each other’ (Koch and Windsperger, 2017, p. 8).

A digital business ecosystem can include more than one platform, and the ecosystem can be a tangible computer hardware system (e.g., iPhone) or intangible software (e.g., AppStore, Google Play store)(Senyo, Liu and Effah, 2019). In the case of AppStore and Google Play, they are intangible ecosystems, and the shared digital platform is Apple IOS or Android. Other examples of digital business ecosystems are Salesforce partner ecosystem and SAP partner ecosystem, which are both SaaS provider ecosystems.

An example of a digital ecosystem that is currently experiencing disruptive transformations is the financial technology (FinTech) ecosystem. Digital technology enables electronic payments via mobile banking and online payments; enables cryptocurrency mining and trading by blockchain and cryptocurrency technologies; and with AI, big data analysis and deep learning are made possible. These services are then provided by digital trading platforms and brokerages (Palmié *et al.*, 2019).

As a summary, the key concepts of the digital context are presented in Table 2-6.

Table 2-6 Summary of key concepts of digital context

	Definition, description	Examples
Digital artefact	a digital object cannot be perceived directly by human observers; a digital object is a bit stream: a series of zeros and ones which, when taken together, encode information in a particular format’ (Allison <i>et al.</i> , 2005, p. 368).	websites on world wide web, mobile applications, digital videos, computer files, software bugs, PC, Wikipedia, blogs, webpages, databases, APIs
Digital platform	‘a set of digital resources — including services and content—that enable value-creating interactions between external producers and consumers’ (Constantinides, Henfridsson and Parker, 2018, p. 381)	online exchange markets (Amazon, Apple, Spotify), social media and user-generated content platforms (Facebook, YouTube, Twitter), sharing economy platforms (Über, Airbnb), crowdsourcing platforms (TaskRabbit, Upwork), crowdfunding and P2P lending platforms (Kickstarter, Indiegogo) (Langley and Leyshon, 2017)

	Definition, description	Examples
Digital business ecosystem (organizational ecosystem)	a collective of firms that is inter-linked by a common interest in the prosperity of a digital technology for materializing their own product or service innovation' (Selander, Henfridsson and Svahn, 2013, p. 184) collection of firms are interacting with a contribution to the complements' (de Reuver, Sørensen and Basole, 2018, p. 127) a network of interdependent organizations linked to or operating around a focal firm or a platform (Snihur, Thomas and Burgelman, 2018, p. 1279)	FinTech ecosystem, AppStore, Google Play Store, Salesforce partner ecosystem, SAP partner ecosystem, Alibaba (has grown as one) (Tan <i>et al.</i> , 2015)
Technical ecosystem	'collection of complements (apps) to the core technical platform, mostly supplied by third party' (de Reuver, Sørensen and Basole, 2018, p. 127)	
Digital infrastructure	The computing and network resources that allow multiple stakeholders to orchestrate their service and content needs (Constantinides, Henfridsson and Parker, 2018, p. 381)	Consists of the internet, open standards (IEEE 802.11), cloud computing resources, social media, 3D printing, web data analytics, AI

The following section defines digital entrepreneurship is defined and other terminology related to the digital venture creation process. In addition, the characteristics of the digital venture creation process are discussed.

2.4 Digital entrepreneurship

As this field of research is relatively new, the concepts related to entrepreneurship and entrepreneurial processes in a digital context are not well established. This chapter discusses the concept of entrepreneurship in a digital context (i.e., digital entrepreneurship) and the contemporary research on digital venture creation.

Various concepts are used, such as digital opportunity (Nambisan, 2017), digital entrepreneurship (Hull *et al.*, 2007; Geissinger *et al.*, 2018; von Briel, Recker and Davidsson, 2018), entrepreneurship in digital society (Gustavsson and Ljungberg, 2018), pure digital entrepreneurship (Nzembayie, Buckley and Cooney, 2018), digital start-up (Steininger, 2018), digital entrepreneurship process (Kraus *et al.*, 2018), digital venture (von Briel, Recker and Davidsson, 2018), and digital venture idea (von Briel, Recker and Davidsson, 2018). To support the development of theoretical framework for the entrepreneurial venture creation process in a digital context, these concepts are discussed in this chapter.

Digital technology is creating new ways to identify, conceptualise, and develop opportunities (Nambisan, 2017; Standing and Mattsson, 2018). However, a suggestion to describe the digital opportunity as ‘digital artefacts and digital platforms serve as part of the new venture idea (outcome), while digital infrastructure serves as an external enabler (supporting the process)’ (Davidsson, 2015; Nambisan, 2017; von Briel, Davidsson and Recker, 2018) raises some questions. Researchers have asked whether the concept of opportunity should be divided this way (Matthew S Wood, 2017; Matthew S. Wood, 2017), as well as why a digital platform cannot serve as an external enabler. What is interesting in this definition is the use of the digital technology concepts to explain the opportunity concept. Furthermore, if digital opportunity is defined in this way, the opportunity identification, development, and exploitation process of digital technology ventures should address the concepts of digital artefacts, digital platforms, and digital infrastructure and their significance in the process. A digital venture idea is defined as ‘a new venture idea that has a digital artefact at the core of the (imagined) market offering’ (von Briel, Recker and Davidsson, 2018, p. 292), and this research adopts this definition.

2.4.1 Definitions related to digital entrepreneurship

The next question is how to define entrepreneurship in a digital context. The relationship between IT and entrepreneurship has been discussed for more than decade (Del Giudice and Straub, 2011; Steininger, 2018), and there are several suggestions for the definition or categorisation of digital entrepreneurship (Hull *et al.*, 2007; Steininger, 2018; Nzembayie, 2019) and how to build frameworks for digital entrepreneurship (Gustavsson and Ljungberg, 2018). The term ‘digital entrepreneurship’ is not well established and can be understood in various ways. A recent article on digital entrepreneurship (Kraus *et al.*, 2018) notes that the commonly used terminology were digital venture, digital innovation, digital enterprise, and digital business.

Digital entrepreneurship can be viewed in degrees of digitalisation (Hull *et al.*, 2007), where the activity level of digitisation is rated as mild, moderate, or extreme depending on the available digital options for sales, as well as the type of product digitalisation, distribution, marketing, stakeholder management, and operations. This approach poses the problem of how to rate the degree of digitalisation because it can change over time when the advancement of digitalisation reaches higher levels. This means it will take deeper

level of digitalisation to reach the the level of moderate in a couple of years, when new infrastructures become widely used (e.g., social media and virtual reality). The category of digital entrepreneurship includes products delivered digitally; typically, the product is only available for sale digitally.

Another categorisation suggests that IT-associated entrepreneurship and business models (Steininger, 2018), value creation, and business models be included in the characteristics. In this model, the degree of IT (facilitator, mediator, outcome) is grounds for categorisation. The term 'digital start-up' is proposed for start-ups that are ubiquitous, meaning that they have a completely digitised product or service which is digitally sold and delivered, and their infrastructure management, customer interface, and value-creating logic are all mediated through IT (Steininger, 2018).

Digital entrepreneurship can also be described as the intersection of digital technologies and entrepreneurship (Nambisan, 2017). Alternatively, it can be defined from the view of ecosystems (Sussan and Acs, 2017) where digital entrepreneurship is one part of the ecosystem, which also consists of digital user citizenship, digital marketplace, and digital infrastructure governance.

In a conference research paper, Gustavsson and Ljungberg (2018) argue that instead of discussing digital entrepreneurship, the researchers should approach the phenomenon with the view of entrepreneurship in digital society (see Table 2-7). Gustavsson and Ljungberg (2018) divide entrepreneurial ventures according to the characteristics of digital technology: programmability, combinatorial, interoperable, editable, and interactive. This categorisation is the only one based on the characteristics of digital technology, instead of the degree to which or the way IT is used in the venture. This categorisation may offer a more distinctive typology method and be used to discover other relevant ways to conduct research.

Table 2-7 Entrepreneurship in digital society (Gustavsson and Ljungberg, 2018, p. 7)

Digital Characteristic	Technology	Entrepreneurial Action	Examples
Programmability	Operating Systems; Applications; device drivers; programming languages; middleware	Create new, or changes existing, digital artefacts.	Platforms, e.g. WhatsApp, YouTube, Uber-app developers

Digital Characteristic	Technology	Entrepreneurial Action	Examples
Combinatorial	Mash-ups	Combine existing digital artefacts in new, novel ways	E.g. services that use Google maps
Interoperable	E-health; Infrastructures; Internet of Things	Connect previously unconnected digital artefacts.	E.g. gateways, proxies
Editable	Blogs; Wikipedia; YouTube, Instagram	Create, change or update content.	Youtubers and bloggers, e.g. PewDiePie
Interactive	Features and affordances presented by applications	Make use of interactivity	Über drivers

A multimethod action research study (Nzembayie, Buckley and Cooney, 2018, p. 3) defines the term pure digital entrepreneurship (PDE) as ‘entrepreneurship in which digital artefacts, digital platforms, or both, are the new venture ideas and market offers; while digital infrastructures and related technologies are immediate external enablers of new venture emergence’ (see also Davidsson, 2015). This definition indicates that digital platforms and artefacts are the market offers which digital entrepreneurship produces (i.e., software, mobile apps, and social media platforms. A similar definition is used for digital ventures: ‘a new venture that has a digital artefact at the core of the market offering’ (von Briel, Recker and Davidsson, 2018, p. 292).

In addition to the definition in Section 1.3.4, this research focuses on digital entrepreneurship, in which the digital idea, the venture development process, and the process outcome are all in digital form. Table 2-8 provides the definitions of these three terms.

Table 2-8 Definitions of digital venture, digital process outcome and digital venture idea

Concept	Definitions	This research defines
Digital venture	‘a new venture that has a digital artefact at the core of the market offering’ (von Briel, Recker and Davidsson, 2018, p. 292) ‘entrepreneurship in which digital artefacts, digital platforms, or both, are the new venture ideas and market offers’ (Nzembayie, Buckley and Cooney, 2018, p. 3)	<i>new venture which has a digital artefact, digital platform or both at the core of the market offering</i>
Digital process outcome	‘the sustained offering of a digital artefact in the market’ (von Briel, Recker and Davidsson, 2018, p. 292).	<i>digital artefacts, digital platforms or both form the core of the new digital market offers</i>
Digital venture idea	‘a new venture idea that has a digital artefact at the core of the (imagined) market offering’ (von Briel, Recker and Davidsson, 2018, p. 292).	<i>digital artefacts, digital platforms or both form the core of the new digital venture ideas</i>

2.4.2 Characteristics of digital venture creation process

Compared to the non-digital world, the nature of the digital entrepreneurship processes is more fluid and less bounded, and entrepreneurial agency is more distributed (Nambisan, 2017). 'Of all the management sciences, entrepreneurship is probably the most agent-centered' (Mole and Mole, 2010, p. 231), and the research on entrepreneurship has been centred on the entrepreneur; however, especially in the digital context, entrepreneurial agency is distributed because of the nature of digital technology and digital artefacts. This distributed entrepreneurial agency requires new research because the earlier research argues that the locus of entrepreneurial agency is situated within individuals, especially the founder (Hmieleski and Baron, 2009; Nambisan, 2017) and the venture team (Klotz, Hmieleski et al. 2014). Examples of this participation in the entrepreneurial processes are engagements through digital infrastructure and platforms, as in crowdsourcing (Zhao and Zhu, 2014) and crowdfunding (Ordanini *et al.*, 2011; Mollick, 2014).

Digital infrastructures have led to democratisation of entrepreneurship (Aldrich, 2014; Nambisan, 2017), meaning more people are able to participate and engage in all stages of entrepreneurial processes, from opportunity identification to venture funding and launch. Cloud computing services have been important in this development, because services such as IaaS change how developers create and develop applications, without spending on their own data centres by using cloud services for needed digital infrastructure instead (Subashini and Kavitha, 2011). Companies can create their whole digital infrastructure without owning servers or data information systems; instead, they can use AWS cloud services (or other service providers) and pay based on their usage, and the service is scalable. These cloud computing services are priced with a 'pay-as-you-go'—model, meaning the user only pays for the services they use. This significantly lowers the cost of entry for start-ups and other businesses and enables them to focus on their core competences (Subashini and Kavitha, 2011).

In a digital context, data and analysis are easily generated. Entrepreneurs talk about 'traction', something digital start-ups begin to build in their solutions, and especially when

they start to seek funding. The term ‘traction’ comes from the words *trajectory* and *action* (Zaheer *et al.*, 2018) and is defined as

‘having a measurable set of customers or users that serves to prove to a potential investor that your start-up is progressing. The way to prove the progress and measure traction is through supporting data, the data could be of profitability, revenues, number of active users or registered users, amount of engagement, partnerships or clients achieved, and the amount of traffic generated’ (Weiss, 2017).

In the early stages of start-up venture creation, the categories of information to which founders dedicate resources, the metrics, are critically important to manage the development of the venture. In the early start-up phase, the metrics for platforms could be liquidity, matching quality, and trust, whereas interaction metrics means ‘there are minimum number of producers and consumers, and the percentage of successful interaction is high’ (Parker, Van Alstyne and Choudary, 2016, pp. 189–191).

Lean metrics involve using one key metric that will bring the desired change (Croll and Yoskovitz, 2013). The idea is to build a minimum viable product (MVP), ‘the smallest thing you can build that will create the value you’ve promised to your market’, and then create a metric (collect data), which can be analysed and used for the development of the solution. A valid metric is comparable and understandable, and it changes development process behaviour.

2.5 Digital innovation

In this section, innovation research in the digital context is discussed. This digital innovation discussion is closely linked to the venture creation of digital entrepreneurship through value-creation mechanisms (see section 3.1.2).

The focus of innovation research has changed from traditional in-house research and development (R&D) processes to more open and user-oriented ways to innovate. The discussion of sources of innovation has shifted from how one source of innovation comes from users and lead-users (Von Hippel, 2005) to open innovation (Chesbrough, 2006; Gassmann, Enkel and Chesbrough, 2010). Since R&D processes are costly, many sources can be found outside the company, and valuable ideas can come from within or outside the company and can go to market from inside or outside the company, as well. Innovating in collaboration with customers (Greer and Lei, 2012), users (Lettl, 2007; Arvantis, Fuchs and Woerter, 2015), and users as active innovators (Bogers, Afuah and Bastian,

2010) is key. Companies obtaining instant feedback from these actors is seen as a factor in the success of the innovation. As small companies have limited resources and market reach, open innovation can help them (Huizingh, 2011). In the open innovation model, the technological base can come from outside or within the company, the innovation can be out-licensed or trigger technology spin-offs to new markets, and technology can be outsourced (Chesbrough, 2012).

A study suggests that the type of innovation, stage of innovation, scope of innovation, and type of organisation are important factors influencing the innovation management approach (Damanpour, 1991). Tidd proposed a model for innovation management (Tidd, 2001), saying that past innovation research has mainly been conducted on US high technology firms (Pisano, 1996; Christensen, 1997) and with regard product development based on the practices of Japanese manufacturers of consumer durables such as electronics or automobiles (Clark and Fujimoto, 1991). Tidd (2001) suggests an innovation space model of categorising innovation on the axes of degree of innovation (i.e., disruptive, radical, incremental) and type of innovation (i.e., process, product, service).

If the degree of innovation or the type of innovation are variables of different innovation management needs, it is possible that digital and non-digital innovation, and their different kinds of innovation processes, are needing different kind of management respectively. In addition, the relationship between innovation and the established, incumbent firms compared to entrants, start-ups and innovation may bring different management needs to the process.

Since this study is interested in the digital context, the literature review of innovation was based on digital innovation (see Appendix 2 Articles of the literature review of digital innovation). Moore's Law, digitalisation and network effects have implications for innovation such as industry transformations (e.g., Apple, Netflix); greater diversity of products and services (e.g., Netflix, Amazon, Hulu's customised ads), greater personalisation of products and services (e.g., gamification); faster innovation cycles (e.g., Capital One, Zara's fast fashion); product pricing and delivery flexibility (e.g., Napster, YouTube); and creation of analytics-driven digital innovation opportunities (e.g., Amazon, business analytics; (Fichman, Dos Santos and Zheng, 2014, p. 338).

Digital innovation can be defined as ‘a product, process, or business model that is perceived as new, requires some significant changes on the part of adopters, and is embodied in or enabled by IT’ (Fichman, Dos Santos and Zheng, 2014, p. 330). Alternatively, ‘digital innovation is the creation of (and consequent change in) market offerings, business processes, or models that result from the use of digital technology’ (Nambisan *et al.*, 2017, p. 224), and it is further described as ‘a constant search for and identification of new or evolved problem–solution pairs’ (Nambisan *et al.*, 2017, p. 228).

This claim of digital innovation outcomes as being either a product, a service, or a process (Fichman, Dos Santos and Zheng, 2014), has critics claiming that digital outcomes have not been studied sufficiently (Kohli and Melville, 2018). The term ‘digital product development’ is used with regard to digital innovation (Lyytinen, Yoo and Boland Jr., 2016), and it refers to products developed with digital technology such as Nike running shoes or Apple computing products. Other ways of defining digital innovation outcomes are new products, services, and platforms (Nambisan *et al.*, 2017).

Digital product innovation has a distributed, emergent nature, and examples of digital product innovations include enterprise resource planning (ERP) software and smartphones (Lyytinen, Yoo and Boland Jr., 2016). This research is interested in ‘pure’ digital ventures, and thus, digital products with a physical layer are outside the scope of this research.

The concept of affordances arises with digital innovation, as the nature of digital technology, re-programmability, and data homogenisation enable open and flexible affordances used for digital innovation (Yoo, Boland Jr, *et al.*, 2012). Affordance in a digital technology context is defined as ‘action potential or possibilities offered by digital technology in relation to a specific user (or user context) in innovation and entrepreneurship’ (Nambisan, Wright and Feldman, 2019, p. 3) and can be divided into digital, spatial, and institutional or social affordances. Digital affordances ‘derive from the technical architecture of digital infrastructures’ (Autio *et al.*, 2017, p. 74), and spatial affordances refer to local, proximity-based mechanisms, such as entrepreneurial ecosystems, which ‘support the cultivation and dissemination of cluster-level architectural knowledge on a *generic* business process:

effective business model innovation and entrepreneurial start-up and scale-up' (Autio *et al.*, 2017, p. 74).

In the following section, the nature of digital innovation process is studied and the relationship between disruptive and radical innovation in start-ups is compared to incumbent firms.

2.5.1 Digital innovation process

Innovation management theories are being challenged in the digital context (Yoo, Henfridsson and Lyytinen, 2010; Yoo, Boland Jr, *et al.*, 2012; Nambisan *et al.*, 2017) because the digital technology context brings new elements to the process. This research divides these new elements into four categories: (1) the distributed nature of the process and product innovation (Yoo, Boland Jr, *et al.*, 2012); (2) the value-creation assumptions in traditional venture creation that are being challenged (Yoo, Boland Jr, *et al.*, 2012; Holmström, 2018); (3) the recombination of digital resources (Henfridsson *et al.*, 2018), or combinatorial innovation (Yoo, Boland Jr, *et al.*, 2012); and (4) the importance of digital technology platforms in the digital innovation process (Yoo, Boland Jr, *et al.*, 2012).

1. Distributed nature of digital innovation process and outcomes

The distributed nature of the innovation process and outcomes means fewer boundaries between the two (Nambisan *et al.*, 2017). The value of a specific digital innovation needs to be viewed not as fixed but as fluid over time (Holmström, 2018).

2. Value creation of digital innovation

Value-creation assumptions of traditional venture creation are replaced in the digital context by innovation from data, co-creation of value, and digital platforms and ecosystems creating value with users (Yoo, Boland Jr, *et al.*, 2012; Holmström, 2018). Value creation in a digital context is discussed in more detail in Section 3.1.2.

3. Combinatorial digital innovation

Recombination of digital resources is the heart of innovation, where recombining digital resources means 'creating and capturing new value by weaving components together in new ways' (Henfridsson *et al.*, 2018, p. 97). The increased flexibility associated with digital technology allows for such recombinations. The loose coupling existing between digital

resources, makes digital innovation not something fixed or having ready-made boundaries (Henfridsson *et al.*, 2018, p. 95). This recombination of digital resources is a model that integrates digital technology characteristics (e.g., layered architecture), where combining of existing modules with embedded digital capabilities has allowed almost limitless recombination of digital artefacts, which are a new source of innovation (Yoo, Boland Jr, *et al.*, 2012). The following list presents key concepts of digital innovation and recombination in design (Henfridsson *et al.*, 2018; Holmström, 2018, p. 108) :

- *Value space*: an evolving network of digital resources interlinked through connections established and dissolved by actors seeking to generate and appropriate value.
- *Digital resources*: entities that serve as the building blocks in the creation and capture of value from information in digital innovation. A particular digital resource belongs to one of the four value spaces: devices, network, services, or contents. It may also be part of several different value paths.
- *Design recombination*: the activity of generating a value path by connecting digital resources as a value offering to users.
- *Use recombination*: the activity of generating an ideographic value path by connecting digital resources in use.
- *Paths channelling*: the activity of steering value connections, and ultimately value paths, through one particular, or a combination of, resource/s to provide the potential for capturing value.

A suggestion for digital innovation process and the stages is presented in the following Table 2-9.

Table 2-9 Stages of digital Innovation (Fichman, Dos Santos and Zheng, 2014, p. 334), moderated presentation

Stage	Explanation
Discovery	<ul style="list-style-type: none"> - new ideas are discovered for potential development into a process, product, or business model innovation - key activities: <i>invention</i>, creation of something new through firm's own creative process) or <i>selection</i>, finding and evaluating innovative technology in external environment to potentially develop or adopt
Development	<ul style="list-style-type: none"> - idea for core technology is developed into usable innovation - key activities: product and business model innovations involve developing and refining the core technology & <i>packaging</i> (surrounding the core technology with complementary products and services that together form a solution) - key activities: process innovations, <i>configuring</i> (deciding which technology features will be used, whether they will be used as is or with adaptations, how the technology will be integrated with other technologies)
Diffusion	<ul style="list-style-type: none"> - innovation diffuses or spreads across a population of potential users - key activities: product and business model innovators, <i>deployment</i> (marshalling resources necessary to persuade and enable a population of firms or individuals to adopt and use the innovation)

Stage	Explanation
Impact	<ul style="list-style-type: none"> - focus is on effects (intended and unintended) that digital innovations, once diffused, have on individuals, organizations, markets and society - key activities: <i>value appropriation</i> and <i>transformation</i>.

4. Importance of digital technology platforms

Importance of digital technology platforms in digital innovation is already discussed in Section 2.3.5.

This presentation of stages is adopted by this research because the focus of this research is on innovative digital start-ups, and digital innovation is part of the venture creation process of a digital venture. The aforementioned entrepreneurial venture creation process stages of opportunity identification, development, and exploitation are also adopted.

5. Importance of digital platforms

The literature on digital innovation discusses the importance of digital technology platforms. They are considered to be ‘the central focus of the innovation’ (Yoo, Boland Jr, *et al.*, 2012, p. 1400), and ‘a building block, providing an essential function to a technological system’ (Gawer, 2009). In Section 2.3.5 digital platforms have already been discussed, and the way that they enable the venture creation and digital innovation process.

A theoretical framework of digital innovation process (Kohli and Melville, 2018) is presented in Section 3.1.1.

2.5.2 Radical and disruptive digital innovations and start-ups

From the new product development and innovation management point of view, start-ups may have an advantage compared to large, established companies since they do not have processes, partners, and business models created to support the status quo (Christensen *et al.*, 2006). This view is supported by Kahn *et al.* (2012), who state that radical new product development (NPD) projects, for example, would require less structure, more exploration, and more process flexibility than incremental projects. New technology start-ups in the digital era are creating disrupting innovations by changing industries, and they have the capacity to scale their operations worldwide (Huang, Henfridsson *et al.* 2017).

Stringer (2000) finds that corporate size is inversely correlated to growth through innovation and argues that small companies are the source of most radical innovations for the following reasons:

- The entire organisation can be built around a single breakthrough concept. Therefore, they have little emotional or economic investment in the status quo;
- Being small places companies closer to the market and makes them more agile; and
- Small companies focus all their limited resources on commercialising the innovation of radical new technology (Stringer, 2000, pp. 74–75).

The first-mover advantage has been the most important competitive advantage in digital technology ventures compared to non-digital ventures (König *et al.*, 2018, p. 2). According to a case study of Amazon and e-commerce, maintaining 'first-mover advantage depends on three main factors: continuous innovation, speed of implementation, and patenting' (Mellahi and Johnson, 2000).

New product development literature mainly focuses on established companies, not start-ups. Start-ups have some advantages that established companies lack, namely completely new ways to innovate and they are free of past ways to organise themselves. This gives start-ups an advantage, especially with regard to radical or disruptive innovations and new business model innovations. Start-ups are able to innovate rapidly, and the speed of new product development could be an advantage.

The idea of being 'disruptive' describes the process of 'how a smaller company with fewer resources is able to successfully challenge established incumbent businesses' (Christensen, Raynor and McDonald, 2015), where small entrants are able to target overlooked segments (lower-end customers) at a lower price and find foothold in less-profitable segments. According to Amazon CEO Jeff Bezos, 'We can no longer make a lot of money from a few readers, but we will make relatively little money from many more readers' (Cozzolino, Verona and Rothaermel, 2018).

The disruptive innovation model (Christensen, Raynor and McDonald, 2015; Christensen *et al.*, 2018) shows the different paths of incumbents and disruptors. Disruptive innovations originate in low-end or new-market footholds and do not 'catch on with mainstream customers until quality catches up to their standards' (Christensen, Raynor and McDon-

ald, 2015), sustaining trajectory to the high end of the market in comparison to the entrant's disruptive trajectory at the low end of the market. Disruption is considered to be a process, and the business models of disruptors are often different than incumbent firms. Researchers argue (Fuller, Jacobides and Reeves, 2019; Palmié *et al.*, 2019) that many disruptive innovations are emerging due to the development and commercialisation of ecosystems, rather than of one firm alone. In Table 2-10, examples of the digital disruption of industries collected from the literature sources are presented.

Table 2-10 Examples of digital disruption of industries

Companies	Combining two (or more) industries together	Type of innovation	References
Skype	software development & telecommunications	VoIP (voice over IP) phone calls	(Yovanof and Hazapis, 2008; Fritscher and Pigneur, 2009; Yoo, Boland Jr, <i>et al.</i> , 2012)
Spotify	music recording, distribution and software development	on-demand music streaming service	(Yoo, Boland Jr, <i>et al.</i> , 2012)
YouTube	home videos, music videos, software development	user-created video sharing platform, system recommends personalized sets of videos to users based on their activity on the site	(Davidson <i>et al.</i> , 2010)
Uber*	taxi service & software development	'ridesharing' app, allows users to hail private cars for travel, allowing drivers to earn money from picking up rides	(Cannon and Summers, 2014; Libert, Wind and Fenley, 2014)
Airbnb	hotel and software development	online community marketplace facilitating short-term rentals ranging from shared accommodations to entire homes	(Libert, Wind and Fenley, 2014; Zervas, Proserpio and Byers, 2017)
Klarna	financial services, and software technology, FinTech	payment solutions, partnership-business model design and governance, collaborating merchants in e-commerce sector	(Wentrup, 2016)
Netflix	TV broadcasting, movies & software development	TV, on-demand Internet video streaming, 2006 Netflix released dataset of 100 million anonymous movie ratings using mining, machine learning and computer science communities to develop systems that could beat accuracy of its recommendation system, Cinematch	(Bennett and Lanning, 2007)
Salesforce	CRM software + new digital business model + cloud services	cloud services, software-as-a-service (SaaS)	(Snihur, Thomas and Burgelman, 2018)

Comp- anies	Combining two (or more) industries to- gether	Type of innovation	References
PayPal	bank & software devel- opment	online payment service C2C	(González, 2004)
Amazon, eBay, Alibaba	e-commerce, physical products, market place and software develop- ment	e-commerce market places, Am- azon creates more value from its knowledge of Internet retailing and website infrastructure, with cloud computing services	(Spector and Richard- son, 2000)
WeChat	bank, taxi service, mo- bile operating system, social media, food deliv- ery, C2C payments, book doctor's appoint- ments, banking services	platform of social media, mobile payment (B2C, B2B, C2C), loca- tion-based services, messaging app, mobile operating system	(Chan, 2015)

*Uber is not considered a disruptive company (Christensen, Raynor and McDonald, 2015); instead, the highly regulated industry is the main reason for the change.

2.6 Conclusions of literature review and identification of research gap

To complete the literature review of entrepreneurial process models, characteristics, building blocks of digital technology, and digital innovation, conclusions are made with regard to (1) existing venture creation process models and missing concepts, (2) digital platforms and their meaning in venture creation process, (3) digital innovation and recombination of digital resources, and (4) the nature of the digital venture creation process.

1. Existing venture creation process models in digital context and missing concepts

The dynamic character of digital artefacts and objects, the fluid nature of digital content, and the shifting architecture into which they are embedded are challenging the principles of traditional cause-effect and means-ends relationships which have been studied with stable (physical) objects (Kallinikos, Aaltonen and Marton, 2013). The existing entrepreneurial models are based on relatively stable and fixed boundaries around the entrepreneurial opportunity (Nambisan, 2017), which is not the case with digital ventures.

The digital economy, which emerged from and is enabled by digital technology, and the increasing rate of digitisation are bringing new elements to entrepreneurship initiatives, such as 'more fluid or less bounded entrepreneurial processes and outcomes and less predefined and more distributed entrepreneurial agency' (Nambisan, 2017), as well as changing the role that entrepreneurial ecosystems play in opportunity discovery and pursuit (Autio *et al.*, 2017).

The existing literature on entrepreneurial process models does not include the meaning of digital platforms. Digital platforms are disrupting industries in a way that cannot be disregarded when creating a model of how entrepreneurial opportunities are identified, developed, and exploited. The digital technology context (Section 2.3), including digital innovation, brings up several concepts and building blocks (e.g., digital infrastructure, digital or online platform, network effect and scalability, generativity, users creating value) which are not included in the existing models of the entrepreneurial venture creation process.

2. Digital platforms and their meaning in venture creation process

Earlier models of entrepreneurial processes lack digital context specific features in their models, such as the meaning of a platform, or ‘platformization’ (Nambisan, Siegel and Kenney, 2018), how digital infrastructure is enabling the exploitation of new opportunities, and how digital artefacts and entrepreneurial ecosystems are changing entrepreneurial processes.

3. Digital innovation and recombination of digital resources

Another change in the landscape of entrepreneurship is digital innovation, which is based on an open innovation paradigm with an emphasis on openness, new ways to collaborate, and partnerships, as well as technology commercialisation. Various stakeholders or innovation intermediaries are requiring new approaches to ‘the discovery, creation and pursuit of entrepreneurial opportunities’ (Nambisan, Siegel and Kenney, 2018, p. 355).

4. Nature of venture creation process

The earlier research assumes ‘the composition of the entrepreneurial team is relatively well defined and stable’ (Nambisan, 2017, p. 8) or that the actors involved in the development of a new opportunity are predefined from the beginning of the process. In the digital technology context, however, it can be questioned whether this is the case. The generative nature of digital technology opportunities allows new actors to be involved during the development process, as digital artefacts can be moderated and edited at any point in the process.

The question of entrepreneurial agency – ‘Should we locate agency in specific individuals, or should we conceptualise entrepreneurs as part of a larger process where agency is distributed and emergent?’ (Garud and Giuliani, 2013) – is an interesting one in a digital context. Since digital artefacts are fluid and borderless, the agency of entrepreneurship can also be distributed.

In addition to the change in entrepreneurial agency, there are new ways to create value from data and from the business model. Digital technology is not only changing products and services but also processes and systems, mainly because traditional processes do not create enough value (Zott and Amit, 2017). New business models are needed to capture value in the digital context, as the whole business model is a new source of innovation.

Digital entrepreneurship research is in its early stage (von Briel, Recker and Davidsson, 2018), and digital start-ups are ‘one of the least researched types of new ventures’ (Steininger, 2018, p. 22). Research on digital entrepreneurship has developed recently (2013–2019) to study platforms, innovation, and lean and agile methods as key topics (Table 2-11). This study contributes to the existing research by examining innovative digital start-ups and their venture creation process, including platforms and their role in the process.

Table 2-11 Phases of development of digital entrepreneurship research (Zaheer, Breyer and Dumay, 2019, p. 5)

Phases	Years	Internet phase	Key research topics
Internet economy	1993-2003	Web 1.0	Value creation, role of internet in value chain and business model (large enterprise context)
e-entrepreneurship	2004-2012	Web 2.0	Entrepreneurial process and entrepreneurial business models
Lean revolution and digital technology perspective	2013-2019	Lean revolution	Entrepreneurial ecosystems, platforms, innovation, Lean and Agile methods

In addition, the meaning and use of digital platforms is also missing (Nambisan, Siegel and Kenney, 2018), as digital platforms are disrupting industries in a way that cannot be disregarded, when creating a model how the entrepreneurial opportunities are identified, developed and exploited. The future research is called upon to acknowledge ‘the different ways in which digital artefacts, platforms, and infrastructure are used and how they affect

the process and outcomes of digital entrepreneurship' (Zaheer, Breyer and Dumay, 2019, p. 10).

Furthermore, entrepreneurial processes are lacking the digital context specific features of digital infrastructures; how the digital infrastructure is enabling the exploitation of new opportunities, how the nature of the digital artefacts and the impact of digital ecosystems are changing entrepreneurial processes.

The earlier research assumes 'the composition of the entrepreneurial team is relatively well defined and stable' (Nambisan, 2017), or that the actors in development in a new opportunity are predefined from the beginning of the development, in digital technology context this can be questioned if it is true. The generative nature of the digital technology opportunities is allowing new actors to be involved during the development process, as the digital artefacts are possible to be moderated and edited any time of the process.

In addition to the change in entrepreneurial agency, there are new ways to create value, from data and from the business model. The digital technology is not only changing products and services but also the processes and systems, the main reason being, that traditional processes do not capture the value in the new digital context (Zott and Amit, 2017), as the new sources of value (e.g. data, recombining resources) need new business models, which can create value of the new digitally supported activities.

To address all the limitations identified in the literature review, the new ways to model ventures in the digital context are studied, and a new theoretical research framework is presented in the following Chapter 3.

3 NEW WAYS OF MODELLING THE DIGITAL VENTURE CREATION PROCESS

‘For each of us, and indeed for all life, the likelihood of flourishing, now and in the future, depends on our ability to innovate in response to new and changed circumstances’ (Upward and Jones, 2016, p. 118)

This chapter presents the literature review of the new methods of modelling the digital venture creation process (3.1). Section 3.2 outlines the theoretical framework of the literature review (see Figure 3-1).

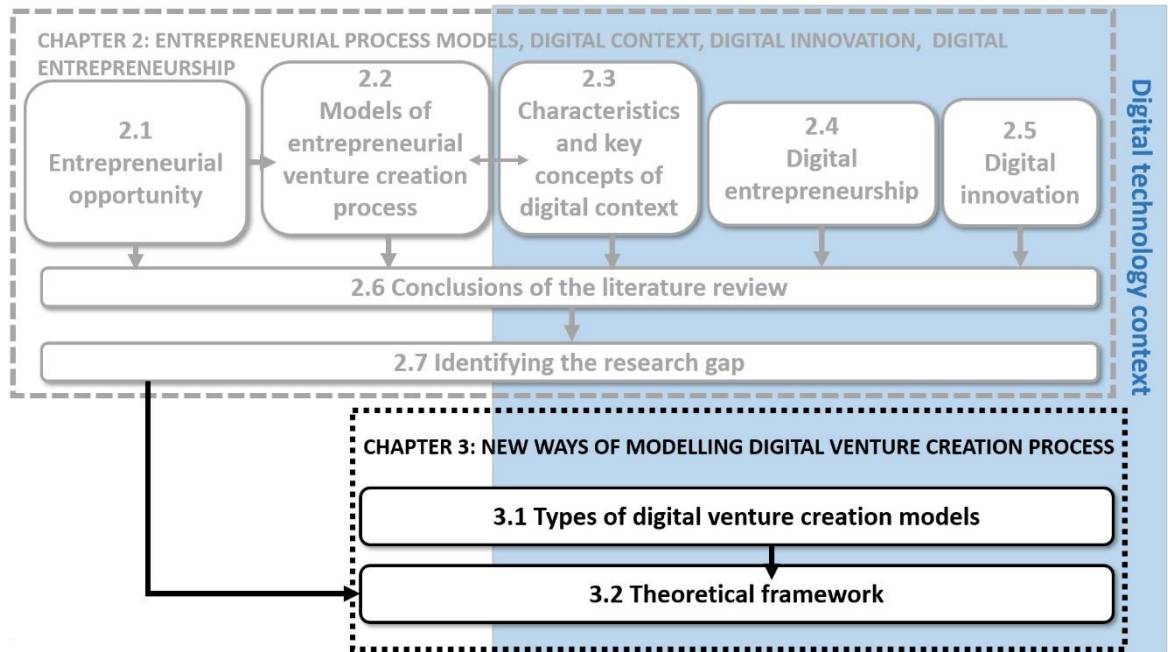


Figure 3-1 Structure of literature review, Chapter 3

As digital entrepreneurial processes are a relatively new line of research, studies of new ways to model the venture creation of a digital entrepreneurship are conducted from different perspectives. There are also new ways of developing business models (BMs). An example of this is the use of visualisation techniques of pattern comics to convey business patterns as narratives (Beynon-Davies, 2018).

3.1 Types of new digital venture creation models

Different types of new venture creation models of digital ventures are longitudinal and cross-sectional; categorised according to business-model type (e.g., platform BMs, data-driven BMs), varied (e.g., ecosystem-level process models), and can model emerging technology (e.g., 5G BM). Digital entrepreneurship process models can be divided into two

categories: sequential (or longitudinal) models and cross-sectional models (Kraus *et al.*, 2018). Table 3-1 uses this categorisation.

Sequential process models outline phases of the venture creation process, which occur in a certain order. Digital venture creation is proposed to include three sequences (initiation, duration and outcome), and the duration of the process is 'the time from venture creation process initiation to outcome' (von Briel, Recker and Davidsson, 2018, p. 292). This definition does not include the exit 'as the ultimate step of the entrepreneurial and start-up process' (Pisoni and Onetti, 2018), and further, the exit phase, when exit is properly planned in the early stage of the process, can have an effect on the decisions made during the venture creation process and to the business model development.

Cross-sectional BMs compare the data of different sections (or dimensions) at a certain point in time. For example, the platform BM is analysed and presented through the three value-related dimensions (value creation, value delivery, and value capture), and the rest of the specifications of the platform model fall into these three sections (Täuscher and Laudien, 2018).

3.1.1 Review of digital venture creation process models

The aim of this systematic literature review is to synthesise (Schryen, Wagner and Benlian, 2015) concepts and process models to create the theoretical framework of this study (Webster and Watson, 2002). There are several ways to present the findings of the literature review, author centric way, chronological way, or concept centric way. The review (see Table 3-1) presents the findings of the literature review in in an author-centric way and in chronological order.

The literature review of the new models in a digital context (see Table 3-1) was gathered using three recommendations (Webster and Watson, 2002, p. xvi): 1) drawing from leading journals and selected reputable conference proceedings, 2) reviewing citations of articles identified, and 3) using Web of Science (and Google Scholar) to look for articles that cite the key articles from the previous step. The review used following search terms: process + venture creation + digital entrepreneurship, digital BM(s), (digital or internet) platform BM, business model innovation (BMI), Lean start-up, data-driven BM, BM disruption, and digital start-ups. The selection criteria for the articles studied is listed below:

- Was published in an academically valued journal (Harzing, 2018) or in the proceedings of a high-quality conference
- Has a high number of citations (Google Scholar; this criterion is only valid with older models)
- Is aligned with the definition of digital start-up in this research, *a venture where digital artefacts, digital platforms, or both are the core of the new market offers and venture ideas*, meaning the model presents the venture creation process of a digital start-up (as opposed to autonomous vehicle, robotics, or IoT BMs)

Table 3-1 Articles of new models of digital venture creation process (in chronological order)

Author(s)	Name of the model (study)	Nature of the model and article	Conclusions of study/ concepts used for framework
(Osterwalder and Pigneur, 2010) GS #cit.=8263+	BM* canvas	cross-Sectional model, nine business model building blocks: key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure and revenue streams	value propositions, key partners, key resources, customer segments, product-market fit crucial to BM
(Teece, 2010) GS #cit.=5490	BM, strategy and innovation	sequential model, not specifically, for digital ventures	select technologies and features to be embedded in the product/service, design mechanisms to capture value
(Wirtz, Schilke and Ullrich, 2010) GS #cit.=628	BM for creating value on internet 2.0	cross-Sectional, 4 C typology of internet BMs (content-oriented, commerce-oriented, context-oriented and connection-oriented) BMs	different types of BMs for different types of ventures
(Ries, 2011; Blank, 2013; Bortolini <i>et al.</i> , 2018) GS #cit.=4330	Lean Startup	sequential & cross-Sectional	Minimum Viable Product (MVP), build, product, measure, data, learn
(Weill, Peter and Woerner, 2013)	Digital BM	theoretical, managerial article	content, customer experience, platform
(Kazan, Tan and Lim, 2015)	Taxonomy of digital BMs for Bitcoin companies	conference paper	
(Muzellec, Ronteau and Lambkin, 2015)	Two-sided Internet platforms: BM lifecycle perspective	cross-Sectional model, qualitative case study (5 internet platform companies)	two-sided platforms need to formulate two different value propositions—end-user side and business side, early start-ups change significantly over time (audience orientation & business model), initial 'raison d'etre' is about B2C, but monetization causes to switch focus to B2B

Author(s)	Name of the model (study)	Nature of the model and article	Conclusions of study/ concepts used for framework
(Tan <i>et al.</i> , 2015)	Process model of multi-sided platform development, role of IS (information systems) capabilities	longitudinal study of Alibaba MSP	IS capabilities, enablers of platform development
(Hartmann <i>et al.</i> , 2016)	Taxonomy of data-driven BMs	cross-sectional, literature review & cluster analysis of 100 business models of random big data start-ups	data sources, key activity, offering, target customer, revenue model, specific cost advantage
(Ojala, 2016)	theory of BM creation and evolution, business model creation under uncertainty	qualitative, single case study, small software gaming company, longitudinal (15 years), cloud gaming markets	business model evolution, BM iterations, Business Model ^{1,2 ...n}
(Parker, Van Alstyne and Choudary, 2016; Van Alstyne, Parker and Choudary, 2016)	Players in a platform ecosystem	HBR article	platform ecosystem BM
(Powell and Sandholtz, 2015; Constantiou, Marton and Tuunainen, 2017; Ritter and Schanz, 2018)	Four sharing economy business models, peer-to-peer sharing services	case study (4 cases)	
(Spiegel <i>et al.</i> , 2016)	Differences between successful and unsuccessful early stage internet start-ups	mixed method, 17 internet start-ups	founders consider business model to be in permanent flux in early start-up stage, networks and connections valuable at early stages
(Fagerholm <i>et al.</i> , 2017)	continuous experimentation, RIGHT model for continuous experimentation	software companies, holistic qualitative multiple case study (2 start-ups, 4 projects), design science	technical infrastructure, information artefacts
(Foss and Saebi, 2016)	BM innovation framework for future research	review of 150 articles on BMI 2000 - 2015	antecedents, BM, novelty & scope
(Hunke <i>et al.</i> , 2017)	Process model of data-driven BMI	sequential, conference proceedings, design science approach, theoretical	initiation, ideation, integration, realization, data need fit, problem-solution fit, product market fit
(Picken, 2017)	Four stages model of entrepreneurial firm, transition period	theoretical, sequential	start-up, transition, scaling, exit

Author(s)	Name of the model (study)	Nature of the model and article	Conclusions of study/ concepts used for framework
(Zott and Amit, 2017) GS #cit.=5294	How to create value in digital world, BMI*	cross-sectional model, example Pokémon Go, three design elements characterize activity system: content, structure and governance, review of literature on BMs	content, structure and governance
(Beynon-Davies, 2018)	BM as patterns	digital BMs as patterns, use of communicative patterns for documenting ways material artefacts (e.g. data structures act), example of e-online grocery	visualizing BMs; to propose better ways of developing new BMs and implementing change
(Standing and Mattsson, 2018)	Simplicity framework of BM conceptualization	sequential, qualitative, interview research Sweden, Denmark, UK & Australia (16) digital start-ups	value proposition; business model components; scale, iteration, speed; usability
(Ghezzi, 2019; Ghezzi and Cavallo, 2020)	Unified framework to connect BMI, Lean Startup Approaches and Agile Development in early stage digital start-ups	cross-Sectional, qualitative, multiple case study, 3 digital star-ups, cross case analysis	Early stage BMI of digital start-ups is about value architecture elements (value creation, value delivery and value capture), experimenting and testing BM, then building products and services, is core step of BMI, strong entrepreneurial & innovative organizational culture fosters BMI in early stage digital start-ups
(Kohli and Melville, 2018)	Theoretical framework of digital innovation actions	sequential, theoretical framework of digital innovation	external competitive environment, digital outcomes, initiate, develop, exploit, internal organizational environment
(Kraus <i>et al.</i> , 2018)	Research map of digital entrepreneurship Digital entrepreneurship process (cross-Sectional vs. longitudinal)	state-of-the-art review digital BMs, digital entrepreneurship process, platform strategies, digital ecosystem, entrepreneurship education, social digital entrepreneurship	cross-sectional vs. longitudinal digital entrepreneurship process models
(König <i>et al.</i> , 2018)	Different patterns of digital and non-digital venture creation BMs	quantitative	iterate business on market early, search funding later
(Lee and Shin, 2018)	FinTech BMs	historical view of FinTech, survey, payment BM, wealth management BM, crowd-funding BM, lending BM, capital market BM, insurance services BM	

Author(s)	Name of the model (study)	Nature of the model and article	Conclusions of study/ concepts used for framework
(Nzembayie, Buckley and Cooney, 2018)	Pure digital entrepreneurship, MIAR process, gaming industry	sequential, qualitative, single case study, action research, case narratives	create MVP, test with users, qualitative feedback from users, evaluate action
(Pisoni and Onetti, 2018)	Exit strategy of start-ups	Sample (5 744 M&A transactions) in US and Europe, data-driven	a) properly planned exit in early stage of start-up process, b) gap of European start-up ecosystems' ability to produce exits and create new large innovative companies (the so-called "unicorns")
(Snihur, Thomas and Burgelman, 2018)	Ecosystem-level process model of BM disruption	sequential qualitative case study Salesforce (disruptor) & Siebel (incumbent)	framing-adaption cycle, holistic framing BM adaption (content, structure partnerships), framing to create visibility, credibility and relations with ecosystem stakeholders
(Täuscher and Laudien, 2018)	Platform BM	cross-Sectional, typology of platform business models	platform BM types
(Yrjölä, Ahokangas and Matinmikko-Blue, 2018)	5G BMs, platform driven BMs via 5G networks	symposium proceedings (IEEE), qualitative, case study, action research, using 5G to provide a) <i>fixed wireless access</i> and b) <i>extreme mobile broadband</i> to meet booming traffic demand, early use cases with "as is" BMs	BM type of 'as is', needs 5G networks
(von Briel, Recker and Davidsson, 2018)	venture creation process dimensions influenced and resulting from different digital artefact compositions	theoretical, review of 8 influential entrepreneurship theories	digital venture creation process includes: initiation, duration, outcome
(Balocco <i>et al.</i> , 2019)	Lean BM change process in digital entrepreneurship	case study of three digital start-ups, qualitative	
(McDonald and Gao, 2019)	Strategic reorientation a.k.a pivoting in new ventures	qualitative comparative case study, two cases of digital finance tech companies	process model of reorientation of new ventures
(Palmié <i>et al.</i> , 2019)	Evolution of the financial technology ecosystem	qualitative 78 expert interviews and secondary data sources, FinTech disruptive innovation ecosystem roadmap	

Author(s)	Name of the model (study)	Nature of the model and article	Conclusions of study/ concepts used for framework
(Zaheer <i>et al.</i> , 2018; Zaheer, Breyer and Dumay, 2019)	Founders' perspectives on achieving 'traction' in digital start-ups, TrAction model	qualitative case study (12 digital start-ups), semi-structured interviews of start-up journey narratives interdisciplinary structured literature review	fast iteration on customer development model (aka MVP), digital start-up mindset, able to face uncertainty and delayed traction digital start-up stages: prospecting, developing and exploiting

The ways of modelling digital ventures from the literature review are further categorised into types of business models: design science models, lean and agile models, life cycle models, and ecosystem-level models (Table 3-2).

Table 3-2 Categorisation of different ways to model digital entrepreneurship venture creation

Types of new models of digital entrepreneurship	Names of the models	Author(s)
Digital BMs	Digital business models	(Weill, Peter and Woerner, 2013)
	Elements of BM design	(Teece, 2010)
	Internet BM	(Wirtz <i>et al.</i> , 2016)
Design science models	Business Model Canvas	(Osterwalder, 2004; Osterwalder and Pigneur, 2010)
Lean and Agile models	Holistic TrAction framework	(Zaheer <i>et al.</i> , 2018)
	Lean start-up	(Ries, 2011; Blank, 2013)
	Lean start-up model	(Bortolini <i>et al.</i> , 2018)
	Multimethod insider action research (MIAR)	(Nzembayie, Buckley and Cooney, 2018)
	RIGHT Rapid iterative value creation gained through high-frequency testing	(Fagerholm <i>et al.</i> , 2017)
	Simplicity framework of business model conceptualization	(Standing and Mattsson, 2018)
	Lean business model change process	(Balocco <i>et al.</i> , 2019)
	Strategic reorientation (a.k.a. pivoting) model	(McDonald and Gao, 2019)
Life cycle models	Four stages model (from start-up to scale-up)	(Picken, 2017)
FinTech BMs	FinTech business models	(Lee and Shin, 2018)
Data driven models	Data driven business model (DDBM) framework	(Hartmann <i>et al.</i> , 2016; Günther <i>et al.</i> , 2017)
Digital innovation models	Digital Innovation Actions	(Kohli and Melville, 2018)
Models of business model innovation	Research Model for Future Business Model Innovation (BMI) Research	(Foss and Saebi, 2016)

Types of new models of digital entrepreneurship	Names of the models	Author(s)
research	BM creation and evolution	(Ojala, 2016)
	Process Model for Data-Driven Business Model Innovation	(Hunke <i>et al.</i> , 2017)
Platform BMs	Players in platform business model, platform business model	(Van Alstyne, Parker and Choudary, 2016; Van Alstyne and Parker, 2017b)
	Platform business model types	(Täuscher and Laudien, 2018)
Emerging technology BMs	As is -model (5G technology)	(Yrjölä, Ahokangas and Matinmikko-Blue, 2018)
Sharing economy BMs	Sharing economy business models	(Ritter and Schanz, 2018)
Ecosystem-level process models	IS capabilities linked to ecosystem development process (Alibaba)	(Tan <i>et al.</i> , 2015)
	Evolution of FinTech ecosystem	(Palmié <i>et al.</i> , 2019)
	Ecosystem-based process model (Salesforce)	(Snihur, Thomas and Burgelman, 2018)
	Ecosystem-based process model (Salesforce)	
Exit and exit strategy models	Life-cycle model of entrepreneurship, including exit	(Pisoni and Onetti, 2018)

The following paragraphs discuss the models in detail.

1. Digital business models

The nature of digital technology impacts the creation of BMs in a digital context. A study comparing successful digital business-centred companies (i.e., Facebook, Apple, and Amazon), and ‘ultra-fades’, companies that were once dominant but somehow lost their standing (i.e., Dell, AOL, and Nokia) found that the single factor that stood out was value: ‘value is not a function of the product or service, is not stable or fixed, and is less and less under the control of providers’ (Keen and Williams, 2013, p. 643), and ‘the very intention of innovators in digital business is that the BM is not an end point, but an interim framework’. Disruptors create new BMs, while incumbent firms neglect to consider the least profitable market (Christensen, Raynor and McDonald, 2015) or the future customer and what they will value when there are more choices (Keen and Williams, 2013). Not all the new digital ventures are disruptors.

Teece (2010) lists the elements of BM design, including the selection of technologies and features to be embedded in the product or service, and determination of the customer benefits. A study of internet BMs (Wirtz, Schilke and Ullrich, 2010) and BMs influenced by

four Web 2.0 factors (social networking, interaction orientation, user-added value, and customisation or personalisation) categorises internet BMs into four types: content, commerce, context, and connection. It notes the relevance of these four factors in the different types of BMs.

Another illustration of digital BMs include three sections: the content, answering the question of what is consumed; the customer experience, which relates to how the content is packaged; and the platform, or how the content and customer experience is delivered (Weill, Peter and Woerner, 2013). This presentation is general and does not describe special types of BMs as the following models do.

Value dimensions in digital BMs can be divided into 1) value-creation logic, 2) value-capturing mechanisms, 3) value-delivery architecture, and 4) value stakeholder network (Kazan, Tan and Lim, 2015). Value stakeholder network refers a type of network in the FinTech industry.

2. Design science models

The business model canvas (BMC) is based on academic research (Osterwalder, 2004; Osterwalder and Pigneur, 2010) which uses the Montreux Jazz Festival (MJF) as a case study. Design science methodology (March, Smith 1995) creates the canvas for the BM. A study by Osterwalder (2004) included the following quote to illustrate the essence of design science:

“The function of what I call design science is to solve problems by introducing into the environment new artefacts, the availability of which will induce their spontaneous employment by humans and thus, coincidentally, cause humans to abandon their previous problem-producing behaviours and devices. For example, when humans have a vital need to cross the roaring rapids of a river, as a design scientist I would design them a bridge, causing them, I am sure, to abandon spontaneously and forever the risking of their lives by trying to swim to the other shore’. (Fuller 1992)

The BMC model functions for both digital and non-digital ventures, and it has become an important tool in the practice of entrepreneurship (e.g., in education and for start-up accelerators), where it assists in the design of BMs such as that of Google, where the traditional pipeline is replaced by a more complex system of monetisation (Osterwalder, 2004; Osterwalder and Pigneur, 2010). The BMC model is comprised of nine building blocks: key partners, key activities, key resources, value propositions, customer relationships, channels, customer segments, cost structure and revenue streams (Osterwalder and Pigneur,

2010), and online tools that exist for experimentation with BM types (*Strategyzer / App*, 2019).

The entrepreneurial design process includes intermediate artefacts, such as BMs, pitches, prototypes, and landing pages (Berglund, Bousfiha and Mansoori, 2020), and this artefact creation is bringing about the changes in the world which move the entrepreneurial design process forward.

The design science approach to entrepreneurship includes the artefacts, problem setting as a key aspect of action, and the notion of actions taken by the entrepreneur (Dimov, 2016). Design science suggests that the purpose of the venture creation is to give direction to the definition of the problem (i.e., what is relevant?) and evaluate market desirability, operational (or technical) feasibility, and financial viability (Dimov, 2016).

3. *Lean and agile start-up models*

Digital businesses in Silicon Valley created the Lean start-up BM (Ries, 2011; Blank, 2013), which emphasises building, measuring, and learning. Although it has garnered attention and has been implemented in some companies, the academic literature on lean start-ups is still quite limited (Yang, Sun and Zhao, 2018). A Lean BM is created and validated through customer development, where the hypothesis of the business is tested on users, and product development is done iteratively and incrementally by building an MVP using agile development, building metrics to measure, accepting failure, and pivoting. In addition, the development speed is rapid and venture development utilises data which is sufficient for the needs of development (Ries, 2011; Blank, 2013).

Some academic studies of Lean start-up model are used in entrepreneurship and innovation (Ladd, Lyytinen and Gemmell, 2015; Tanev *et al.*, 2015; Bortolini *et al.*, 2018; Ghezzi and Cavallo, 2020). According to the literature, the method could be improved by including milestones or checkpoints in the model and including the tools for designing immature products (Bortolini *et al.*, 2018).

A case study of two start-up companies (four projects) presents a model of continuous experimentation (Fagerholm *et al.*, 2017) called rapid iterative value creation gained

through high-frequency testing. The model builds an infrastructure architecture which allows for learning from customers' real-time software usage.

In a quantitative study comparing different patterns in the evolution of digital and non-digital ventures, the BMC and Lean start-up models were used (König *et al.*, 2018). The study during 2000–2016 of business plans in Germany found that it is essential to create proof of business offers from the start (König *et al.*, 2018).

A qualitative study of 16 Scandinavian, British, and Australian start-ups (Standing and Mattsson, 2018)) suggests a four-phase model: 1) value proposition (simple value expression); 2) BM components (marketing component, transaction, matching component, back office component); 3) scale, iteration, and speed (simple logistics, aim to get online quickly, start small, iterative improvement); and 4) usability (simple user communication, easy to use).

Multimethod insider action research (MIAR) is used in a case study of game development (Nzembayie, Buckley and Cooney, 2018). The study proposes a model of several cycles to study the entrepreneurial journey and conducts three MIAR cycles capturing events occurring during the three time frames of the cycles. Each development cycle includes four phases: constructing the problem, planning action, taking action, and evaluating action. The list of activities involved are synthesised below according to the first (1), second (2), and third (3) cycles (Nzembayie, Buckley and Cooney, 2018, pp. 7–8).

- Constructing problem: use business model canvas to articulate digital new venture idea (1); team formulation (1); assessing affordability and calculating financial risks (opportunity confidence; 1); create a MVP (2); continuously elicit customer feedback for product development (2)
- Planning action: contractual agreement with partners (1); limited customer pre-testing, begin website as blog (1); upload the solution to the cloud (2); attract early users and learn from feedback (2); implement new technology based on lessons from previous cycles (3)
- Taking action: usability testing, initiating firm corporation; pivot of revenue model (1); tracking qualitative feedback from the users (2); continuously test usability with actual end users (3)
- Evaluating action: summarise lessons for next cycle (1); discuss potential ethical concerns with data dissemination (1); develop more templates and new games for 'real' MVP in the next cycle (2); prepare to develop a real MVP to validate BM (3).

A holistic TrAction framework (Zaheer *et al.*, 2018) is created from a qualitative case study, using 12 journey narratives of digital, early stage start-up founders. The focus of the research is on early success (i.e., traction) and the contributing success factors from the perspective of the founders. The TrAction model is divided into two sections: trajectory and action. Trajectory includes vision, purpose, values, timing, focus, and enablers (digital start-up mindset, founding team, survival mechanisms, and skills). Action includes product development, performance (key metrics), quality assurance, branding, customer, and growth hacking. The model suggests that a start-up mindset includes entrepreneurial orientation, understanding of web and mobile technologies and the global online marketplace, experimentation, being hands-on both technologically and in a business sense, learning, and naïveté (Zaheer *et al.*, 2018, p. 11).

A process model using comparative cases from FinTech wealth management business focuses on how pivoting can be done without penalty, which the study calls ‘strategic reorientation’ (McDonald and Gao, 2019). This process model suggests that, when pivoting, a company should justify their reorientation and prepare the audience to make the transformation between pivots less abrupt.

4. *Life cycle models*

Life cycle models are divided into either three or four stages in the entrepreneurial life cycle. The four-stage model (Picken, 2017) includes start-up (define and validate the business concept); transition (lay the foundation for a scalable business); scaling (add resources to profitably scale the enterprise); and exit (harvest the venture through IPO, private sale, merger, or acquisition). The model also lists eight hurdles that occur during the transition period (e.g., positioning products/service in an expanded market, developing effective processes and infrastructures, building financial capability, managing risks and vulnerabilities).

Another life cycle model concentrates on the exit stage (Pisoni and Onetti, 2018). The stages include stand-up (decision to start a new venture or join an innovative venture), start-up (business idea development, business model implementation, operations start), and scale-up (expand the company in terms of market access, revenue, and added value with number of employees). The exit is considered to be the final phase of the start-up

process, and for high-growth ventures, the exit is a way to build a profitable venture (Pisoni and Onetti, 2018, p. 32). The study compares the start-up exits of 5,744 US and European companies. There has been significant increase in European exits, as established companies are interested in acquiring new start-ups, and the older the start-up, the lower the interest in its acquisition.

5. *FinTech business models*

Financial technology (FinTech) is bringing new start-ups, innovations, and disruption to the financial industry, where the drivers for this rapid change are sharing economy, favourable regulation, and information technology (Mackenzie, 2015; Economist, 2017). FinTech BMs can be categorised by function, by data-driven BM types, or by new cryptocurrencies. Payment BMs, wealth management BMs, crowdfunding BMs, lending BMs, capital market BMs, and insurance services BMs are categorised by function (Lee and Shin, 2018). Cryptocurrency (e.g., blockchain) business model categorisation includes trading platforms, payment applications, software solution providers, credit cards, wallet providers, and applications for business and private customers (Beinke, Nguyen and Teuteberg, 2018). Furthermore, data-driven Fintech business models are divided into data processing, information processing, data aggregation, data analytics, data distribution, and data value chain models (Schmidt, Drews and Schirmer, 2018).

6. *Data-driven business models*

Data-driven BMs deal with big data. Companies are able to innovate their BMs 'when big data leads them to inter alia develop whole new value propositions, target different customers, or interact with customers in different ways' (Günther *et al.*, 2017, p. 198). An example of this is Netflix, a company producing data-driven content that 'offers media streaming to customers, constructs dynamic recommendations based on users' behavioural patterns, and uses data to inform content for its productions' (Günther *et al.*, 2017). The study of data-driven BMs (Hartmann *et al.*, 2016) suggests a taxonomy for start-ups which 'capture value from data as a key resource, adding a business perspective to the discussion of big data' (Hartmann *et al.*, 2016). The taxonomy of the model includes data sources (internal and external), key ways the data is handled, offering, target customer (B2B, B2C), revenue model, and specific cost advantage.

7. *Digital innovation model*

The model of digital innovation actions (Kohli and Melville, 2018), uses the same type of grouping (external competitive environment, internal organisational environment, and digital innovation outcomes), and its phases are initiate, develop, implement, and exploit.

8. *Models of business model innovation research*

Business model innovation (BMI), the new business model, can be a source of innovation, as the new BM is a 'complete reconfiguration of how a company does business' (Zott and Amit, 2017, p. 19). A study of 15 years of research on BMI suggests a research model for future research in the field (Foss and Saebi, 2016, p. 215). The model suggests 'the causal web in which BMI is situated' include antecedents, moderating, mediating, and outcome variables. The antecedents of business model innovation are divided into two, external (e.g. change in competition, technologies), and internal (e.g. dynamic capabilities as capability to seize opportunities); the moderators are divided into three, macro-level (e.g. regulations), firm-level (e.g. top management team, values), and micro-level (open mindedness, adversity to change); and the outcomes of BMI relate to e.g. cost reduction and financial performance.

A study of early-stage internet start-ups found the meaning of antecedents in the results, where founders' professional social networks are critical for success, because they gain trust and credibility through their networks. Established networks help provide access to customers and business partners and thus achieve product-market fit (Spiegel *et al.*, 2016).

A 15-year longitudinal case study of the gaming industry (Ojala, 2016, p. 468) created a model of BM creation and evolution where technology is constantly changing and the markets for the venture do not yet exist. The model illustrates how the BM is iterated, and further evolves via BM reassessment and development, as well as how technology evolution and BM evolution impact each other.

An aforementioned study of lean and agile models views how digital ventures innovate with their BMs similarly, stating that digital ventures 'iterate their business on the market early and search for investment afterwards'. Contrariwise, non-digital ventures already

need financial investments in the early stages to set up a product ready to be tested on the market' (König *et al.*, 2018, p. 1). This is also a finding from a mixed-method study (Spiegel *et al.*, 2016) where the results show that founders did not follow a clear strategy of BM development; instead, BM evolved around a 'core idea'.

9. Platform business models

The traditional pipeline BM has been replaced with platform BM in cases such as Über, Airbnb, or Apple Store; the latter 'built a platform on top of a product' (Van Alstyne and Parker, 2017a, p. 27), where the platform provides a vast range of additional services through iTunes and AppStore for the actual product. Earlier BMs, such as product and pipeline BMs, are defined by product features, but the platform BM is defined by the community (Parker, Van Alstyne and Choudary, 2016). Digital platform BMs are superior to pipeline model of business because platforms unlock new sources of value creation and supply (Parker, Van Alstyne and Choudary, 2016, p. 8).

Platform BMs can be categorised by value attributes and BM attributes (Täuscher and Laudien, 2018). Value attributes are value capture (pricing mechanism, revenue source, price discrimination); value delivery (key value proposition, transaction content, transaction type, industry scope, market participants, geographic scope); and value creation (platform type, price discovery, review system). Platforms can be web-based or mobile applications; their key activity may be data services, community building, or content creation.

Platforms are shaped by the external values of the community because the platform community takes form outside of the company (Alstyne, Parker and Choudary, 2016; Parker, Van Alstyne and Choudary, 2016), as in the case of Apple iPhone and its application providers. The network-centric view of entrepreneurship in digital platforms notes how the 'increased modularity of digital systems has unleashed a broad wave of entrepreneurial firms that innovate and launch modules (of compatible applications) to align with specific platform architectures' (Srinivasan and Venkatraman, 2018, p. 57).

10. Emerging technology business models

Emerging BMs are models, which are coming when the technology is in greater use (both devices and the networks). One of the emerging technologies is the 5G next-generation network. (Currently, we have 3G or 4G network connections.) The 5G network offers wireless fixed access and extreme mobile broadband which enable streaming in (almost) real-time and watching multiple videos simultaneously, among other characteristics. The 5G BMs are called 'as-is' models (Yrjölä, Ahokangas and Matinmikko-Blue, 2018).

11. Sharing economy business models

Platforms also play a part in collaborative consumption as a 'sharing economy'; they support more efficient asset utilisation as a 'peer-to-peer-based activity of obtaining, giving, or sharing the access to goods and services, coordinated through community-based online services' (Evans and Gawer, 2016; Hamari *et al.*, 2016, p. 2047). Even though the sharing of goods and services is not a new phenomenon, 'the key enabler to this marketplace operating at scale has been the rise of websites that facilitate far more of these transactions' (Zervas, Proserpio and Byers, 2017, p. 688). Sharing economy BM typologies are based on value creation and delivery or value capture by revenue stream. The typologies are singular transaction models (e.g., Netbike, Car2go); subscription-based models (e.g., Netflix); commission-based platforms (Über, AirBnB9, Booking.com, eBay); and unlimited platforms (e.g., Craigslist, Wikipedia, Couchsurfing) (Ritter and Schanz, 2018).

12. Ecosystem-level process models

Entrepreneurial process models can take place in the company level, but also ecosystem - level process models have emerged. A study of the digital ecosystem strategy of Alibaba.com and the role of information systems (IS) capabilities found that IS capabilities are linked to each phase and stage of the ecosystem development process (Tan *et al.*, 2015). The study's three phases are 1) initiating multi-sided platform (MSP) development, 2) enabling platform strategy, and 3) enacting the MSP development. The process also incorporates the nascent, formative, and mature stages of development. Capabilities refer to the theory of dynamic capabilities and their role in BM development (Teece, 2018). A company's dynamic capabilities can identify opportunities, design and refine the BM, and

commit resources. In the Alibaba digital MSP ecosystem process model study, IS capabilities refer to market responsiveness, IS infrastructure, IS technical skills, IS development, cost-effective IS operations, IS strategy alignment, and IS planning (Tan *et al.*, 2015).

A study of two CRM software companies – a disruptor (Salesforce) and an incumbent (Siebel) – and their BM development, adaption, and change (growth) over time presents an ecosystem-level process model of BM disruption. The disruptor creates an ecosystem of Software-as-a-Service on-demand business services, and Oracle acquired the incumbent in 2016. In the ecosystem-level process model of BM disruption (Snihur, Thomas and Burgelman, 2018), the disruptor's 'strategic gambit' is to build a framing-adaption cycle, where the framing creates visibility and credibility, and the BM is 'carefully and continuously' adapted (i.e., content, structure, and partnerships) to the ecosystems needs (Snihur, Thomas and Burgelman, 2018, p. 1299).

A FinTech study of the ecosystem-level venture development (Palmié *et al.*, 2019) presents a disruptive innovation ecosystem roadmap with different ecosystem transformations.

13. Exit and exit strategy

The concepts of entrepreneurial exit and exit strategy are models that illustrate the process components not discussed yet (Pisoni and Onetti, 2018). The entrepreneurial exit can occur through an initial public offering (IPO) or a merger and acquisition (M&A). Lean start-up ideology views the exit as an opportunity to 'fail fast and learn quickly', in order to potentially pivot and find a more scalable and sustainable BM (Ries, 2011; Blank, 2013; Pisoni and Onetti, 2018). The exit of the entrepreneurial venture is seen as a 'dynamic, fluid and critical component of the entrepreneurial process' (Wennberg and DeTienne, 2014, p. 5), and the plan of the exit strategy should be included in the development of the venture early on, as 'the exit may occur at any time during the process' (Pisoni and Onetti, 2018, p. 27).

A theory-based suggestion for venture creation process dimensions of digital artefact creation is to divide the process into three dimensions: initiation, duration, and outcome (von Briel, Recker and Davidsson, 2018). This suggests that, depending on the composition of the artefact, the venture creation process will vary.

Initiation is defined as ‘the first concrete actions taken to materialize the a digital artefact’; *duration* stands for ‘the time from venture creation process initiation to outcome’; and *outcome* means ‘the sustained offering of a digital artefact’ (von Briel, Recker and Davidsson, 2018, p. 287). The first concrete actions taken may be difficult to define for the purpose of this research, but they can be used parallel to duration. This research adopts this way of dividing the process into the dimensions because the dimensions are considered to be different digital artefact compositions that affect the nature of the venture creation process. The more loosely coupled and ephemeral the artefact components are, the easier the initiation process, the shorter the process duration, and the more iterative and evolutionary the outcome (von Briel, Recker and Davidsson, 2018).

3.1.2 Value creation in digital context

Value creation process in traditional models are within the boundaries fo the firm, but with the digital context the value creation process is open for multiple firms (Koch and Windsperger, 2017). The digital economy and digitisation of information, combined with the internet, provides an infinite array of possibilities for new combinations and the potential to experiment with new value creation mechanisms (Carlsson, 2004; Zott, Amit and Massa, 2011). The value creating mechanisms in a digital context are different from those in a traditional business (Amit and Zott, 2001; Koch and Windsperger, 2017; Nzembayie, Buckley and Cooney, 2018). In traditional businesses, the key sources of value creation are scope and scale, which both require physical resources (Yoo, Henfridsson and Lyytinen, 2010, p. 729) and within the boundaries of one firm. In digital businesses, the sources of value creation are data (information) (Bharadwaj *et al.*, 2013; Rindfleisch *et al.*, 2017); multisided BMs (e.g., platforms) (Van Alstyne, Parker and Choudary, 2016); coordinated digital ecosystems (e.g., Apple) (Bharadwaj *et al.*, 2013; Koch and Windsperger, 2017); and resource configuration (Amit and Han, 2017; Henfridsson *et al.*, 2018).

In virtual markets, value creation opportunities arise from *new combinations of information* (Amit and Zott, 2001). With value creation through *digital innovation by data*, companies seek to ‘acquire and analyse a variety of consumer data such as online shopping, social media, and web browsing behaviour to enhance their innovation activities’ (Rindfleisch *et al.*, 2017, p. 1). Big data and analytics are a source of strategic business value (Grover *et al.*, 2018).

Multisided business models, such as digital platforms, grow in value with usage and create value jointly with the various players in the ecosystem (Van Alstyne, Parker and Choudary, 2016), and the growth is outside the organisation, as in network effects. If pipeline BMs are interested in the features of the product, platforms are interested in building community and the ecosystem around it (e.g., Über) to ‘maximize the total value of an expanding ecosystem in a circular, iterative, feedback-driven process’ (Van Alstyne and Parker, 2017a, pp. 4–5). In the traditional ‘pipeline’ BMs, individual firms create value by controlling linear value-added chain of activities (i.e., a linear value stream), as in a classic value-chain model (Porter, 2008).

In *coordinated digital ecosystems*, the value is co-created, where ‘value creation processes in an emerging digital environment is based on the contribution of multiple stakeholders who integrate and apply resources for themselves and for others’ (Koch and Windsperger, 2017, p. 2). Examples of these multi-sided platforms that can also be considered ecosystems and which offer complementary and sometimes competing services are the US GAFA companies (Google, Amazon, Facebook, and Apple) and the Chinese BAT companies (Baidu, Alibaba, and Tencent/WeChat)(Miguel and Casado, 2016), which have common features, as they are ‘doing everything’ in the digital ecosystem (Robles, 2018). The Apple ecosystem includes devices, iTunes, Apple Store (online and physical), Apple Pay, Apple Health, and application providers. The Chinese Tencent ecosystem includes e-commerce, content and media, messaging and social media, sharing economy, AI, smart devices, blockchain, FinTech, education, gaming, and e-sport. (Robles, 2018). From the list of the 100 largest companies in the world by market value in 2018, only Chinese Baidu is not among the first eight (Statista, 2018a).

The value-creating possibilities through scaling are different from pipeline BMs, for example, in speed (Alstyne, Parker and Choudary, 2016; Parker, Van Alstyne and Choudary, 2016). The term ‘blitz scaling’ refers to quickly scaling, and digital technology in the form of software enables this, because ‘software has a natural affinity for blitz scaling, as the marginal costs of serving any size market are virtually zero (Sullivan, 2016). For instance, the more videos are uploaded to YouTube, the more valuable the service is, and the more views a video obtains, the more advertisers are willing to pay for advertisements.

The value spaces network presents a theoretical model of *resource reconfiguration*, or resource combination, as a mechanism of value creation (Henfridsson *et al.*, 2018), which is discussed in Section 2.5.1. This tool, suggested for ‘better understanding value creation and capture in digital innovation’ (Holmström, 2018), illustrates the creation of value through various actions such as design recombination and use recombination. By reconfiguring or weaving together the components of digital technology in new ways (Henfridsson *et al.*, 2018, p. 97), new value is created, and these re-combinations can take place across the different layers of digital infrastructure as shown in the modular architecture of digital technology (e.g., content, service, network, devices). Resource reconfiguration ‘can happen both within and across organizational boundaries’ (Yoo, Boland Jr, *et al.*, 2012, p. 1401).

Resource recombination, which fosters innovation and brings value, is not new since the ‘carrying out new combinations’ as innovation by entrepreneurs leads to economic development (Hagedoorn, 1996, p. 885; Schumpeter, 2017, p. xxi). Although Schumpeter’s theories were created well before the digital economy (1934), researchers are still adapting his theories into the research (Hagedoorn, 1996; Henfridsson *et al.*, 2018; Holmström, 2018).

3.1.3 Comparing digital and non-digital venture creation processes

In this research, the concept of *digital venture creation process* refers to both the venture creation process in a digital context and to the entrepreneurial opportunity identification, evaluation, development, and exploitation process in a digital context. Table 3-3 categorises the concepts of non-digital and digital entrepreneurship using the elements of a dynamic state model (Levie and Lichtenstein, 2010).

Table 3-3 Comparison of concepts of digital and non-digital entrepreneurship

Elements of dynamic state model/ entrepreneurial artefacts (Levie and Lichtenstein, 2010)	Concepts or building blocks from non-digital and digital business model* research	Non-digital entrepreneurship	Digital entrepreneurship
Business model	BM design/tasks, BMI	Business plan? BMs of non-digital entrepreneurship need financial investments early, to set up product ready to be market tested (König <i>et al.</i> , 2018)	digital BM, data-driven BM, platform BM, BMI, search for BM (Blank and Dorf, 2012; Hartmann <i>et al.</i> , 2016; Ojala, 2016; Van Alstyne and Parker, 2017a), iterate BMI early, search funding later (König <i>et al.</i> , 2018)
	Value creation	‘pipeline’ businesses create value by controlling linear series of activities, classic value-chain model (Porter, 2008; Van Alstyne, Parker and Choudary, 2016, p. 54)	dimensions of value: value capture, value delivery, value creation, contribution of multiple stakeholders (Koch and Windsperger, 2017; Standing and Mattsson, 2018; Täuscher and Laudien, 2018), value stakeholder network (Kazan, Tan and Lim, 2015)
	BM components	market, value proposition, capabilities, value chain, cost and profit, value network (suppliers, product/service flows), competitive strategy and strategic choices (target market, offering, branding, differentiation, mission), resources/assets, processes, channels (Chesbrough, 2002; Osterwalder and Pigneur, 2010)	content (what is consumed), customer experience, platform (how it is delivered) (Weill, Peter and Woerner, 2013), content, structure, partnerships (Snihur, Thomas and Burgelman, 2018)
Resources and capabilities	Entrepreneurial agency	Entrepreneurial team, entrepreneur and co-founders	Entrepreneurial team, entrepreneur and co-founders & distributed entrepreneurial agency (Garud, Gehman and Giuliani, 2014; Nambisan, 2017)
	Data, big data*	amount of data compared to digital entrepreneurship not equal access as in digital business (Hair <i>et al.</i> , 2012)	data and digital information and its management source and driver of digital entrepreneurship (Kraus <i>et al.</i> , 2018)
	Measure of size of the company (success)	Revenue, market share, number of employees (Constantinides, Henfridsson and Parker, 2018)	User base being key indicator of success of digital ventures, rapid scaling through user base (Kelestyn, Henfridsson and Nandhakumar, 2017; Constantinides, Henfridsson and Parker, 2018; Standing and Mattsson, 2018)

Elements of dynamic state model/ entrepreneurial artefacts (Levie and Lichtenstein, 2010)	Concepts or building blocks from non-digital and digital business model* research	Non-digital entrepreneurship	Digital entrepreneurship
	Social capital	social networks	social networks, SNS social networking sites (Spiegel <i>et al.</i> , 2016), partnerships (Snihur, Thomas and Burgelman, 2018)
	Funding and investment	investment/funding needed for starting business (Chandler and Hanks, 1998) , cost of entry	lower cost of entry , lower need for investment in the early stages, no fixed assets, ICOs as new ways to finance ventures (Fisch, 2018; König <i>et al.</i> , 2018; Nambisan, Siegel and Kenney, 2018)
	Infrastructure	Non-digital infrastructure, physical logistics, supply chain management	Cloud computing (IaaS, PaaS, SaaS) Digital infrastructures e.g. internet; data centres; open standards (USB, IEEE 802.11); consumer devices as smartphones; and tablets (Constantinides, Henfridsson and Parker, 2018, p. 381), virtual world infrastructure (Chandra and Leenders, 2012)
Inter-firm collaboration, supply-demand relationships	Industry boundaries	clear boundaries, supply chains (Porter, 2008)	blurred, changing industry structure (Yoo, Henfridsson and Lyytinen, 2010; Bharadwaj <i>et al.</i> , 2013)
	Platforms (technical)	physical platforms: shopping malls, supermarkets, catalogues, department stores, fairs, industry parks, travel agencies, newspapers (Van Alstyne, Parker and Choudary, 2016, p. 4)	digital platforms: shared, common set of services and architecture that serves to host complementary offerings, iOS, Android (Yoo, Boland Jr, <i>et al.</i> , 2012; Ghazawneh and Henfridsson, 2013; Tilson, Sørensen and Lyytinen, 2013; Still <i>et al.</i> , 2017; de Reuver, Sørensen and Basole, 2018), e.g. iTunes, Apple and Android Store, Amazon
	Platforms (socio-technical)		social media platforms (e.g. Facebook, Twitter)
	Ecosystems	business ecosystems e.g. solar photovoltaic panel producers, racking producers, installation providers (Jacobides, Cennamo and Gawer, 2018)	digital ecosystems (Selander, Henfridsson and Svahn, 2013), FinTech ecosystem (Lee and Shin, 2018) e.g. multi-sided platforms (eBay), open source software (Android), Apple iOS and compatible apps
	Partnerships		partnerships adapted to needs of new ecosystem (Snihur, Thomas and Burgelman, 2018)
Entrepreneurial practices	Virtual work, virtual teams		(Bailey, Leonardi and Barley, 2012)

Elements of dynamic state model/ entrepreneurial artefacts (Levie and Lichtenstein, 2010)	Concepts or building blocks from non-digital and digital business model* research	Non-digital entrepreneurship	Digital entrepreneurship
Venture growth	Scalability	traditional way of growing through new locations, personnel, mass production and logistics, Standard oil, Sears, GE, or sales levels, profitability, and market share (Chandler, 1990; McKelvie and Wiklund, 2010)	rapid scaling through user base (Huang <i>et al.</i> , 2017), and network effect (Parker, Van Alstyne and Choudary, 2016; Van Alstyne, Parker and Choudary, 2016)
Entrepreneurial outcomes		products, services, processes	digital artefacts and objects (Kallinikos, Aaltonen and Marton, 2013), digital applications, platforms, digital services
Strategy		(Business) strategy (Barney, 1986; Porter, 1989)	Speed (digital business strategy) decision making, product launches, supply orchestration, network formation and adaptation (Bharadwaj <i>et al.</i> , 2013)
Product development, innovation	testing of new concepts and products	in-house product development (Leonard-Barton, 1992)	Lean start-up method (Blank and Dorf, 2012), cloud computing, digital makerspaces, and data analytics have made it possible for new ventures to cost effectively construct and test novel concepts involving a larger set of potential customers (Nambisan, 2018)
	Usability		(Nzembayie, Buckley and Cooney, 2018; Standing and Mattsson, 2018)

3.2 Theoretical framework

This section first presents the theoretical approach of this study, followed by the theoretical framework and contributions to knowledge.

3.2.1 Multidisciplinary, theoretical approach

This multidisciplinary study includes three research areas: entrepreneurship, IS, and innovation management (see Table 3-4) in order to address the research focus of innovative digital start-ups. The digital technology start-up is studied from the entrepreneurial process and venture creation process viewpoint. Thus, this study examines concepts and

models related to entrepreneurship literature, as well as the innovation management literature related to opportunity development and innovation process. The context of digital technology is studied in the information systems literature.

Table 3-4 lists the theoretical concepts of this multidisciplinary research.

Table 3-4 Theoretical concepts of this multidisciplinary research according to discipline

Discipline	Concepts	References
ENTREPRENEURSHIP	antecedents of opportunity identification: personality traits, social networks, prior knowledge, entrepreneurial alertness	(Ardichvili, Cardozo and Ray, 2003; Short <i>et al.</i> , 2010)
	opportunity; definition of opportunity	(Davidsson, 2015; Hjorth, Holt and Steyaert, 2015; Ramoglou and Zyglidopoulos, 2015; Matthew S Wood, 2017)
	opportunity identification, recognition, creation, discovery	(Ardichvili, Cardozo and Ray, 2003; Baron and Ensley, 2006; Alvarez and Barney, 2007; Dimov, 2007; Suddaby, Bruton and Si, 2015; Berglund and Korsgaard, 2017; Kuckertz <i>et al.</i> , 2017)
	processes of opportunity evaluation, development, venture growth, opportunity identification, development and exploitation process, venture creation	(Shane and Venkataraman, 2000; Ardichvili, Cardozo and Ray, 2003; Levie and Lichtenstein, 2010; Moroz and Hindle, 2012; Alvarez, Barney and Anderson, 2013; Vogel, 2016)
	entrepreneurial artefacts, entrepreneurship and business model	(Sarasvathy, 2003; Zott and Amit, 2010; George and Bock, 2011; Venkataraman <i>et al.</i> , 2012, 2013; Selden and Fletcher, 2015)
INFORMATION SYSTEMS	digital economy, digitization, digital disruption	(Tapscott, 1996; Margherio <i>et al.</i> , 1998; Carlsson, 2004; Goldfarb, Greenstein and Tucker, 2015)
	characteristics and types of digital technology	(Zittrain, 2006; Tilson, Lyytinen and Sørensen, 2010; Yoo, Henfridsson and Lyytinen, 2010; Bharadwaj <i>et al.</i> , 2013; Kallinikos, Aaltonen and Marton, 2013; Gustavsson and Ljungberg, 2018)
	digital objects and artefacts	(Ekbja, 2009; Yoo, Henfridsson and Lyytinen, 2010; Kallinikos, Aaltonen and Marton, 2013)
	digital platforms, scaling, network effect, user base	(Tilson, Sørensen and Lyytinen, 2013; Gawer, 2014; Parker, Van Alstyne and Choudary, 2016; Van Alstyne, Parker and Choudary, 2016; Huang <i>et al.</i> , 2017; Karhu, Gustafsson and Lyytinen, 2018)
	digital infrastructures and digital ecosystems	(Hanseth and Lyytinen, 2010; Weill and Woerner, 2015; Koch and Windsperger, 2017)
	cloud computing, data as a resource, big data	(Fox <i>et al.</i> , 2009; Ibrahim Abaker Targio Hashem <i>et al.</i> , 2014; Evans, 2017; Benlian <i>et al.</i> , 2018)
INNOVATION MANAGEMENT	type and degree of innovation: incremental, radical and disruptive innovation; democratizing innovation; open innovation model, technological base can	(Tidd, 2001; Von Hippel, 2005; Chesbrough, 2012)

Dis- ci- pline	Concepts	References
	come outside of company (technology insourcing)	
	digital innovation	(Yoo, Henfridsson and Lyytinen, 2010; Yoo, Boland Jr, <i>et al.</i> , 2012; Fichman, Dos Santos and Zheng, 2014; Nambisan <i>et al.</i> , 2017; Henfridsson <i>et al.</i> , 2018; Kohli and Melville, 2018)
	disruptive innovation and start-ups, disruptive innovation model	(Stringer, 2000; Christensen, Raynor and McDonald, 2015; Huang <i>et al.</i> , 2017)
	digital innovation models	(Fichman, Dos Santos and Zheng, 2014; Henfridsson <i>et al.</i> , 2018; Holmström, 2018)

3.2.2 Building the theoretical framework

The aim was to build a framework of a venture creation process model of innovative digital start-ups. The multidisciplinary theoretical framework was built by studying the existing literature of three disciplines: entrepreneurial, innovation management, and information science.

According to the synthesis of the entrepreneurial literature review, the opportunity identification, development, and exploitation processes consist of entrepreneurial artefacts; are dynamic, cyclical, and iterative in nature; and occur through repetitive interaction with relevant actors. A dynamic view of opportunity development and exploitation process means the process of a start-up venture is not linear following the life-cycle theories; instead, the process is dynamic, and the entrepreneurial journeys can vary greatly depending on the enabling circumstances and events. Iterative refers to the trial-and-error approach, because of uncertainty, unpredictability and risk. The characteristics of entrepreneurial venture creation from the entrepreneurship literature are as follows:

- The entrepreneurial venture creation process starts with trigger, which generates a venture idea, defined ‘as a preliminary and mostly incomplete mental representation of the concept for a potential future venture’ (Vogel, 2016, p. 8)
- Process is dynamic, iterative, and cyclical in nature (Ardichvili, Cardozo and Ray, 2003; Levie and Lichtenstein, 2010; Short *et al.*, 2010); ‘iterative and of trial and error, that fail and succeed to produce novel products and services’ (Alvarez, Barney and Anderson, 2013; Mason and Harvey, 2013); and process happens in the development cycles (Snihur, Reiche and Quintane, 2014)
- Process includes external enablers, new venture idea, identification, opportunity confidence, action, and outcomes (Davidsson, 2015)
- Entrepreneurial process cannot be abstracted from its contextual setting (Moroz and Hindle, 2012)

- Entrepreneurial process can be divided into three phases – identification, evaluation, and exploitation (Shane and Venkataraman, 2000) – or a variation (Matthew S Wood, 2017)
- The purpose of the venture creation is to give direction to the definition of the problem (what is relevant?), how to solve the problem, evaluation of market desirability, operational or technical feasibility, and financial viability (Dimov, 2016)

The study of digital context (via studies of information systems) brings new concepts; new digital building blocks (infrastructure, platforms, ecosystems); and new ways to add value to the entrepreneurial venture creation and digital innovation process. The following list details these characteristics:

- Value creation and value proposition; digital ecosystems in value creation (Constantinides, Henfridsson and Parker, 2018; Henfridsson *et al.*, 2018); digital platforms (Parker and Van Alstyne, 2017; Van Alstyne and Parker, 2017a; de Reuver, Sørensen and Basole, 2018); and digital infrastructures providing entrepreneurial opportunities (Constantinides, Henfridsson and Parker, 2018)
- Disruptive entrants (start-ups) target the low end of the market while incumbents take the most profitable high end of the market (Christensen, Raynor and McDonald, 2015)
- Selecting technologies (Teece, 2010); recombining the use, design, and resources of the digital infrastructure (Yoo, Henfridsson and Lyytinen, 2010; Henfridsson *et al.*, 2018; Holmström, 2018); digital resources as ‘entities that serve as building blocks in the creation and capture of value from information’ (Henfridsson *et al.*, 2018, p. 90)
- Data as a resource; big data to build new businesses and create value (Hartmann *et al.*, 2016); and information artefacts
- Strategic importance of the size of the user base (Constantinides, Henfridsson and Parker, 2018, p. 389)

The literature review of digital innovation generated the following list:

- Importance of digital technology platforms in digital innovation (Yoo, Boland Jr, *et al.*, 2012)
- The digital innovation process phases are discovery, development, diffusion, and impact (Fichman, Dos Santos and Zheng, 2014)
- Distributed nature of innovation; fewer boundaries of process and outcomes; fewer pre-definitions of innovation agency (Nambisan *et al.*, 2017)
- Iterative cycles of design recombination and use recombination of digital resources (Henfridsson 2018)

The synthesis of digital entrepreneurship and new models of venture creation of digital entrepreneurship are gathered in the following list:

- Digital venture idea is a ‘a new venture idea that has a digital artefact at the core of the (imagined) market offering’ (von Briel, Recker and Davidsson, 2018, p. 292)
- Antecedents are prior knowledge, change in technology, and regulations (Foss and Saebi, 2016)

- Less bounded, evolutionary, and fluid nature of venture creation process of digital ventures (Nambisan, 2017; von Briel, Recker and Davidsson, 2018); blurred, changing industry structures; and distributed entrepreneurial agency (Nambisan, 2017)
- Digital ventures of higher proportion of (temporal) ephemeral and loosely coupled artefact components have discrete process interdependencies, which blurs the boundaries between individual development stages of the process (von Briel, Recker and Davidsson, 2018)
- Build product, measure, collect data, and learn (Bortolini et al., 2018); product development through fast prototypes, MVPs, with larger set of users (Lenarduzzi and Taibi, 2016); framing-adaption cycle, holistic framing BM adaption (content, structure partnerships), and framing to create visibility; and credibility and relations with ecosystem stakeholders (Snihur, Thomas and Burgelman, 2018)
- Lower cost of entry (König et al., 2018; Nambisan, Siegel and Kenney, 2018) due to less need for physical assets when using cloud computing (Parker and Van Alstyne, 2017)
- Rapid scaling through user base and network effect (Huang et al., 2017)
- Opportunity identification, development, and exploitation process; initiation (first concrete actions taken to materialise the digital artefact); duration (time from venture creation process initiation to outcome); and outcome (sustained offering of a digital artefact; (von Briel, Recker and Davidsson, 2018, p. 287); and the digital innovation process phases are discovery, development, diffusion, and impact (Fichman, Dos Santos and Zheng, 2014)
- Process includes external enablers, new venture idea, identification, opportunity confidence, action (Davidsson, 2015), and digital artefacts in the core of outcomes (von Briel, Recker and Davidsson, 2018)
- Properly planned exit in early stage of start-up process (Pisoni and Onetti, 2018)
- Value propositions, key partners, key resources, customer segments, and product-market fit crucial to BM (Osterwalder and Pigneur, 2010); data need fit, problem-solution fit, and product-market fit (Hunke et al., 2017)
- Business model evolution, BM iterations, BM 1,2 ...n (Ojala, 2016); iterative, innovative BM search, such as digital platform BM (Wirtz, Schilke and Ullrich, 2010; Täuscher and Laudien, 2018), data-driven BM, platform BM, business model innovation and search for BM (Blank and Dorf, 2012; Hartmann et al., 2016; Ojala, 2016; Van Alstyne and Parker, 2017a); BM is developed in early stage of start-ups, and it changes significantly and rapidly (Spiegel et al., 2016)
- Learning and development from continuous experimentation enabled by infrastructure architecture including tasks, technical infrastructure, and information artefacts (Fagerholm et al., 2017)
- Business model moderators: macro-level, firm-level, and micro-level (Foss and Saebi, 2016); digital start-up mindset, able to face uncertainty and delayed traction (Zaheer et al., 2018)
- Speed, fast iteration of customer development model (i.e., MVP) or prototypes (Zaheer et al., 2018); testing new concepts through digital infrastructure with a larger set of potential customers (Nambisan, Siegel and Kenney, 2018); value proposition tested on users (Blank and Dorf, 2012; Nzembayie, Buckley and Cooney, 2018)

- Sources of value creation: data (information)((Bharadwaj *et al.*, 2013; Rindfleisch *et al.*, 2017); multisided BMs (e.g., platforms)(Van Alstyne, Parker and Choudary, 2016); coordinated digital ecosystems (e.g., Apple)(Bharadwaj *et al.*, 2013; Koch and Windsperger, 2017); and resource configuration

There is no unified way to name the phases of the process. While the literature review does show a consensus of dividing the ‘phases’ or ‘stages’ or ‘dimensions’ of the digital start-up process into three units, there is not even a unified term for the ‘stages’; sometimes the literature uses both ‘stages’ and ‘dimensions’. It seems the term dimensions is only used to find a term which is not stages, because the stages model is shot down by (Levie and Lichtenstein, 2010). This research uses the term ‘phase’.

The entrepreneurship research literature suggests that the process phases are 1) *identification, evaluation, and exploitation* (Shane and Venkataraman, 2000); as stated in Section 2.2.3, this research adopts the terms ‘opportunity identification’, ‘evaluation’, ‘development’, and ‘exploitation’; 2) digital venture creation process of digital artefact view *as initiation* (first concrete actions taken to materialise the a digital artefact), *duration* (time from venture creation process initiation to outcome), and *outcome* (sustained offering of a digital artefact) (von Briel, Recker and Davidsson, 2018, p. 287); 3) digital innovation process phases from digital innovation research are *discovery, development, diffusion, and impact* (Fichman, Dos Santos and Zheng, 2014); and 4) digital start-up stages are prospecting, developing, and exploiting (Zaheer, Breyer and Dumay, 2019, p. 12).

Figure 3-2 illustrates the theoretical framework of the venture creation process of innovative digital start-ups, highlighting the context of digital technology in the background of the framework.

The theoretical framework presents how the entrepreneurial venture creation process and the findings from the literature review of the features of the process – the digital context; the characteristics, nature, and building blocks of digital technology; and digital innovation characteristics – contribute to the theory of the venture creation process of an innovative digital start-up.

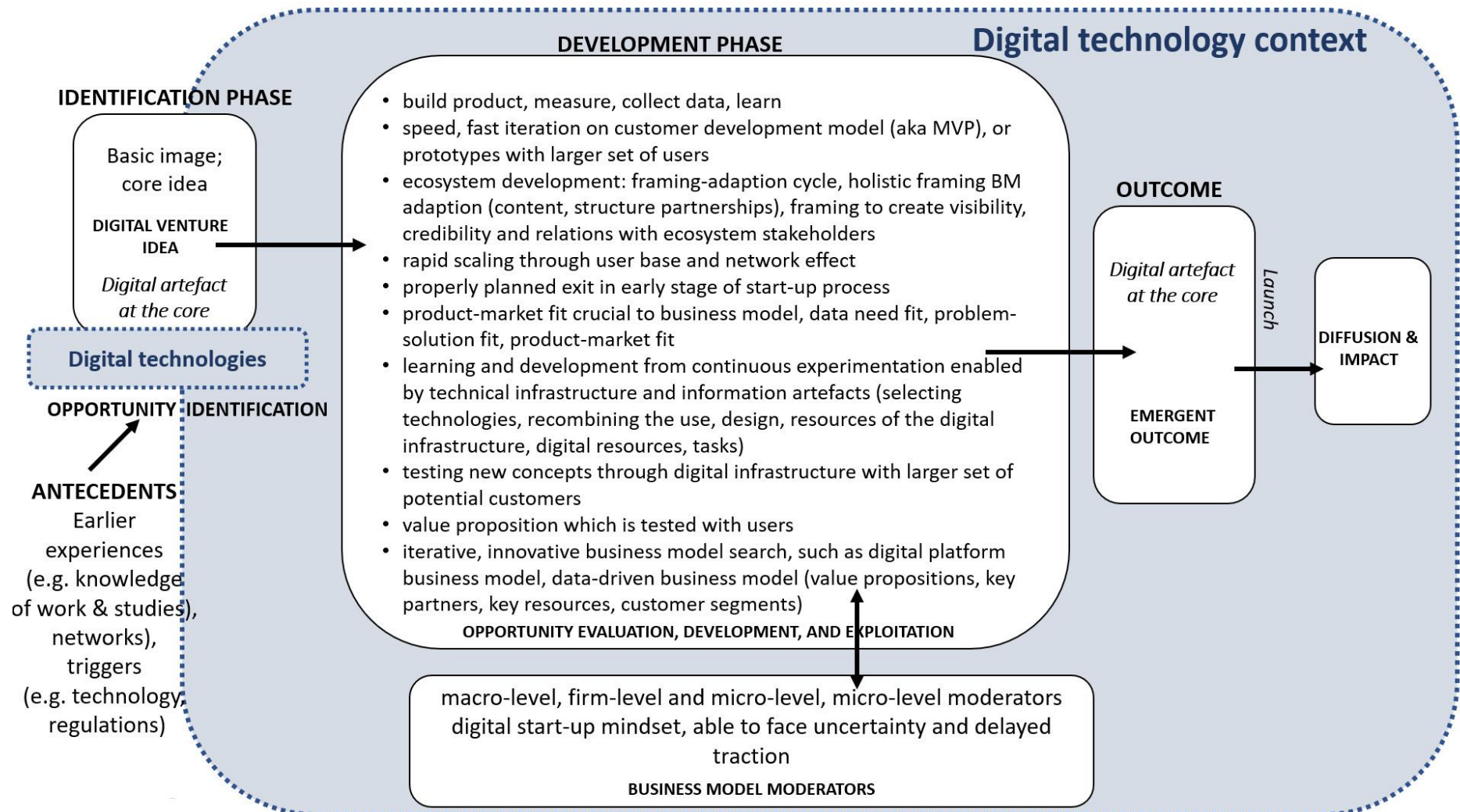


Figure 3-2 Theoretical framework of venture creation process of digital, innovative start-up

4 METHODOLOGY, METHODS, AND RESEARCH DESIGN

'We need a way to argue what we know based on the process by which we came to know it.' (Agar, 1996, p. 13; Guest, MacQueen and Namey, 2011, p. 4)

This chapter discusses the research design and methodology of this study, as well as the reasons for the choices made. In addition, it presents the limitations of the chosen methodology and the ways to try to minimise the effects of these limitations.

Research methodology refers to 'the process where the design of the research and choice of particular methods (and justification of these in relation to the research project) are made evident' (King, 2018, p. 7). As the definition states, the justification of the choices to conduct the research in a certain way are drawn from the aim of the research.

This is an exploratory and descriptive research study with the aim of exploring the venture creation process of innovative start-ups in the digital context. The digital context is unpredictable, nonlinear, and uncertain, and the outcome of the entrepreneurial endeavour is not known. This aim is achieved by:

- a. creating a theoretical framework to describe the digital venture creation *process*;
- b. building a new holistic model of digital venture creation process of an early stage, innovative start-up venture; and
- c. finding and describing patterns regarding the nature of the entrepreneurial journey.

4.1 Philosophical position

This section first discusses the philosophical position of this research, starting with the social sciences, epistemology, and ontology. It subsequently examines the research approach and research protocol.

4.1.1 Research philosophy, social sciences, and entrepreneurship

The theory of science and what is considered as science (Shapin, 1982; Polkinghorne, 1983) has a long history. In 1858, Johan Gustav Droysen was the first person to divide scientific methods into physical sciences and human sciences, and he used the German terms '*erklären* (to explain) for physical science methods and *verstehen* (to understand) for human science methods' (Polkinghorne, 1983, p. 22). In the neo-Kantian view, this dichotomy between physical and human science, and their fundamental difference, is the rea-

son that different kinds of sciences require different research methods. Today, the sciences are divided into ‘the three cultures’ (Kagan, 2009), namely natural sciences (e.g., biology, geology, physics, chemistry, astronomy); social sciences (e.g., organisational research, entrepreneurship); and humanities (e.g., psychology, art history). Human sciences, or humanities, study human behaviour and ‘provide an understanding of human experience’ (Polkinghorne, 1983, p. 22).

Empirical social science research emerged during ‘the rise of capitalism with the processes of urbanization and industrialization’ (Alastalo, 2008). The first books about social science research methods were written in French (*The Rules of Sociological Method* by Emile Durkheim in 1895) and German (*Objectivity in Social Science and Social Policy* in 1904 and *Critical Studies in the Logic of the Cultural Sciences* in 1906, both by Max Weber) (Huff, 1981; Alastalo, 2008).

The field of entrepreneurship research is within the social sciences domain and is the youngest paradigm in management science, despite being more than 200 years old (Bull and Willard, 1993). It is still a relatively new paradigm compared to physics (Bygrave 1989), see Table 4-1. The origins of entrepreneurship research lay in the economic theories of Adam Smith (Smith, 1817, 1937); Jean Baptiste Say (Say, 1820, 2001); Schumpeter (1934; 1961, 2010; Hagedoorn, 1996), and Weber (1994; 2004; 2013) (Bygrave, Churchill and Bygrave, 1989; Bull and Willard, 1993). One of the most cited early writers on entrepreneurship, Schumpeter, wrote about entrepreneurs, enterprise, innovation, and new combinations 85 years ago, and his theories are still adapted. Chapter 2 discusses this further.

Depending on how one wants to define , the earliest publications of information science is *As We May Think* by Bush (1945). When comparing entrepreneurship research and information systems science to physics (see Table 4-1), the research methodologies used for a type of science such as physics may not be the best for a study on the crossroads of entrepreneurship and information systems, as in the case for this research. Bygrave et al. (1989) state that research methodologies for entrepreneurship should have less physics envy, include more empirical models, be less concerned with sophisticated statistics, as

well as include more field research, more longitudinal studies, and original field-derived data banks.

Table 4-1 Comparison of three disciplines, inspired by Bygrave, Churchill, and Bygrave (1989)

		Physics	Entrepreneurship	Information Systems Science
	References	(Bygrave, Churchill and Bygrave, 1989)	(Bygrave, Churchill and Bygrave, 1989; Murphy, Liao and Welsch, 2006; Landström and Lohrke, 2010)	(Eisgruber, 1973; Herner, 1984; Aspray, 1990; Randell, 1994; March and Smith, 1995)
HISTORY	Origins	5 th century B.C. Democritus, Plato	500-100 C.E Europe 1755 Cantillon (France) 18 th century A.D. (Smith, Say 1776)	Babbage 1821 automatic calculation, analytic engine 1914 (computer science discipline)
	Modern	17 th century A.D. Newton	20 th century A.D. (Schumpeter 1934, Weber, Kirzner, Knight) 1879-1940 economics era, 1940-1970 social sciences era, 1970- management studies era	first computer 1940s von Neumann machine, Alan Turing 1940s father of computer science, 1950s linear programming (agriculture), micro-processor 1960s, computer revolution 1960s, ENIAC originates from library science, computer science (antecedent punched-card technology) (computer science)
	Empirical research	> 2 000 years	1970s and 1980s	1970s 1980s
	Theory	17 th century A.D.	1970s and 1980s	1970s 1980s
	Teaching	> 2 000 years	~ 50 years	~ 50 years
	Science	Natural science, physical science	Social science	Design science, technology oriented
THEORETICAL TOOLS	Theories	abstract (conservation principles)	empirical (premises of social sciences)	empirical
	Models	robust (laws, principles)	fragile (phenomenological)	creating models, methods, implementations
	Parameters	constant	changing	changing
	Predictions	accurate	crude	crude
EMPIRICAL TOOLS	Variables	precise definitions (mass, length, time, e)	fuzzy definitions (opportunity, resources, performance)	fuzzy definitions (information, data, software, code)
	Instruments	universal accuracy (rules, scales, clocks, meters)	dubious accuracy (questionnaires, interviews, financial numbers and calculations)	dubious accuracy (model testing, build and evaluate)

		Physics	Entrepreneurship	Information Systems Science
	Populations	distinct (particles, nuclei, atoms, gases, liquids, solids)	nebulous (individuals, firms, industries)	artefacts created (e.g. software)

Epistemology and ontology

Epistemology asks, ‘How can we know the things that exist?’ (Willis, 2007, p. 9); it is ‘the study of the criteria by which we can know what does and does not constitute warranted, or scientific, knowledge’ (Symon and Cassell, 2012, p. 16). Epistemology is the researcher’s view regarding what constitutes accepted knowledge (Saunders, Lewis and Thornhill, 2016) in a specific field of study.

The ontological questions, ‘the assumptions which concern the very essence of the phenomena under investigation’ (Burrell, Morgan and Morgan, 2017), may be ‘What are the universal characteristics of things that exist?’

In the social sciences, organisational theories can be viewed according to four philosophies: functionalist, interpretive, radical humanist, and radical structuralist. The functionalist and interpretive paradigms correspond with quantitative and qualitative research (Burrell, Morgan and Morgan, 2017). In business research, the five major philosophies are positivism, critical realism, interpretivism, postmodernism, and pragmatism (Saunders, Lewis and Thornhill, 2016). The researcher created a table of three epistemological positions (positivism, critical realism, and interpretivism) to convey the differences between their meta-theoretical position (see Table 4-2).

Table 4-2 Different philosophical positions

Meta-theoretical assumptions about	Positivism	Realism Critical realism	Interpretivism; hermeneutics
Supporting references	(Weber, 2004)	(Bhaskar, 1998; Mingers, 2004; Fleetwood, 2005; Leitch and Palmer, 2010; Martinez Dy, Martin and Marlow, 2018)	(Weber, 2004; Willis, 2007; Leitch, Hill and Harrison, 2010; Schwartz-Shea and Yanow, 2013; Chell, 2014)

Meta-theoretical assumptions about	Positivism	Realism Critical realism	Interpretivism; hermeneutics
Ontology	Person (researcher) and reality are separate, concrete, tangible		Person (researcher) and reality are inseparable, reality is the product of individual consciousness
Epistemology How can we know	Objective reality exist beyond the human mind	events would exist whether or not they were observed or there even were observers	Knowledge of the world is intentionally constituted through a person's lived experience, subjective interpretation of the world from perspective of the subject
Aim	Explanation, deduction, crating general laws, quantification	interested in social problems, power dynamics, systems of domination, instances of resistance	
Research Object	Research object has inherent qualities that exist independently of the researcher, unit of analysis is treated as an object		Research object is interpreted in light of meaning structure of person's lived experience
Method	Statistical analysis, content, testing, analysis, 'scientific methods' quantitative methods	Quantitative and qualitative, multi-methodology	Hermeneutics, phenomenology qualitative methods: case studies, interviews, observation
Theory of truth	Correspondence theory of truth: one-to-one mapping between research statement and reality		Truth as intentional fulfillment: interpretations of research object match lived experience of object, truth emerges from the consistency and coherence with which a narrative hang together and interpretation from the context
Validity	Certainty: data truly measures reality		Defensible knowledge claims
Generalizability	Generalization of results to a class is the object; as is the ability to test theory		May be able to generalize to theory given sufficient cases and detailed content analysis
Type of knowledge	Objective, general, robots theory-led, theory confirming, rational, scientific		Subjective, particular, local, exploratory, theory building
Reliability	Replicability: research results can be reproduced, data should be subject to test of consistency		Interpretive awareness: researchers recognize and address implications of their subjectivity, feeding back results of textual analysis to the subject, seeking to

Meta-theoretical assumptions about	Positivism	Realism Critical realism	Interpretivism; hermeneutics
			probe any inconsistencies and obtaining narratives from more than one subject
		researchers will only be able to understand what is going on in the social world, if we understand the social structures that have given rise to the phenomena that we are trying to understand	How people interpret the world around them?

Since the emergence of different types of sciences, the methodological debate has been ongoing. Methodology as the means of knowing is in the midst of paradigm wars, especially between quantitative and qualitative research (Alasuutari, Bickman and Brannen, 2008; Bryman, 2008). Typically, quantitative research is associated with a positivist and objectivist stance and with natural sciences, using statistical research methods (Bliss, 1967), mathematics as probability theory (Sonette, 2006), and objective measurement. Qualitative research, on the other hand, is associated with an interpretivist and constructionist research position (Bryman, 2008).

The research aim dictates the research philosophy choices. This research is not positivist because that would indicate fact gathering, measurable data gathering, and hypothesis testing (Bryman and Bell, 2011) or finding empirical regularities and statistically significant correlations between the variables (Hume *et al.*, 2003; Fitzpatrick, 2005).

The ontological position of objectivism implies that ‘the organization has a reality that is external to the individuals who inhabit it’ (Bryman and Bell, 2011, p. 32). In contrast, constructionism considers that ‘social phenomena and their meanings are continually being accomplished by social actors’ (Bryman and Bell, 2011, p. 33).

The other epistemological position presented in Table 4-2 is realism, which is divided into empirical (Bryman and Bell, 2011, p. 29); direct (Saunders, Lewis and Thornhill, 2016); and critical. According to direct realism, ‘what you see is what you get; what we experience through our senses portrays the world accurately’ (Saunders, Lewis and Thornhill, 2016,

p. 715). In contrast, critical realism argues that researchers will only be able to understand the social world if we understand the social structures that have given rise to the phenomena being studied (Saunders, Lewis and Thornhill, 2016). Examples of critical realist studies in entrepreneurship are a feminist study of digital entrepreneurship (Martinez Dy, Martin and Marlow, 2018) and a study of institutional entrepreneurship (Leca and Naccache, 2006).

The third epistemological position, interpretivism, is 'directed at understanding phenomenon from an individual's perspective, investigating interaction among individuals, as well as historical and cultural contexts (Scotland, 2012). Interpretivists are concerned with the 'meanings' people attach to social situations. Some interpretivists argue that human actions are not governed by cause and effect at all, but rather by the rules used to interpret the social world (Fitzpatrick, 2005). Interpretivists claim that 'there can be no understanding of the social world without interpretation' (Leitch, Hill and Harrison, 2010, p. 70).

Interpretivist entrepreneurship research is 'capable of producing rich data through which respondents' experiences, perceptions, and beliefs may be accessed' (Leitch, Hill and Harrison, 2010, p. 80). This research adopts the interpretivist view, as it studies the digital technology perspective and interprets the experiences of start-up entrepreneurs.

4.1.2 Research philosophy and information systems research

In Table 4-3 studies of interpretivism are gathered according to the disciplines of entrepreneurship and information systems.

In information systems research (IS), interpretive research has also become an important position (Klein and Myers, 1999; Walsham, 2006), even though IS research has been mostly quantitative (71 % until 2004) and positivist (89 %), compared to qualitative (20 %) and interpretivist (11 %) research (Becker and Niehaves, 2007). Interpretive research in the IS domain states that 'any observable organizational patterns are constantly changing because, as Parmenides observed, "You cannot swim in the same river twice,"' ((Klein and Myers, 1999, p. 69). Organisations are not static, and interpretive research attempts to understand a moving target; thus, interpretive research is idiographic ((Klein and Myers, 1999, p. 69).

Table 4-3 . Studies of interpretivism in entrepreneurship and in IS

Discipline	Interpretivist research
Entrepreneurship	interpretivism (Chell and Allman, 2003; Jennings, Perren and Carter, 2005; Leitch, Hill and Harrison, 2010; Packard, 2017), interpretivist & structuration (Sarason, Dean and Dillard, 2006),
Information systems	interpretivism (Klein and Myers, 1999, 2001; Walsham, 2006; Goldkuhl, 2012)

The philosophical position of this research falls into the category of interpretivist because this study seeks to understand and interpret (and look for patterns in) the entrepreneurial venture creation process in the digital context. Positivism is not suitable, as this research needs rich, context-specific data and is interested in exploring a phenomenon. Nor is the critical realism approach relevant, because this research is not looking at critically the phenomenon, nor is it interested in power dynamics; instead, it is explorative and descriptive.

Downing (2005, p. 196) claims that ‘entrepreneurship, like the rest of social life, is a collaborative social achievement, and the interactions of entrepreneurs and their stakeholders sustain and transform the nature of entrepreneurship’. This aligns with social constructionism. Fletcher discusses the ontological position of a *social constructionist* (2006, p. 437), arguing that, in entrepreneurship, ideas about processes of social construction go further than other approaches with regard to ‘what goes on as people relate to various mental models, heuristics, life experiences, biographies and knowledge of (or gaps in) particular consumer patterns to enact business opportunities’.

The structuration view of entrepreneurship and new ventures suggests that, with structuration framework, the ontological assumptions view the relationship between entrepreneur and opportunity ‘as socially embedded constructs’ (Sarason, Dean and Dillard, 2006, p. 300). An example from Apple provides clarity:

‘Steve Jobs, the creator of Apple Computer, conceptualized a computer as a tool for the desk top and promised to unleash the power of computing. It was his unique conceptualization of a computer, and his ability to get others to believe in his vision of a computer, that contributed to the success of the venture. Steve Job’s unique conceptualization of the computer was not until he conceptualized it and set events into motion.’ (Sarason, Dean and Dillard, 2006, p. 300)

4.1.3 Justification of research paradigm

In justifying the research paradigm, two views were adopted to fit the needs of this research: an interpretivist position with performative features. In a comparison of philosophical approaches in entrepreneurship, Packard (2017, p. 544) discusses interpretivist versus performative approaches (Garud, Gehman and Giuliani, 2018, p. 62). The entrepreneurship field is researched from two philosophical standpoints, which are similar to those of this research. Table 4-4 presents these two views, as well as the view of this research.

Performativity, or looking at entrepreneurship as an ongoing journey (Garud, Gehman and Tharchen, 2018), suggests the adoption of a new, ‘far more distributed and emergent view of entrepreneurship as process than interpretivism affords’ (Garud, Gehman and Giuliani, 2018, p. 60). The performativist approach is ‘an acknowledgement that phenomena are constituted, de-constituted, and re-constituted through the sayings and doings of multiple socially embedded and materially embodied actors who attempt to make meaning of unfolding processes’ (Bruner, 1986; Garud, Gehman and Giuliani, 2018, p. 61), and statements and subjects emerge from a field of dynamic and contingent possibilities (Barad, 2003; Garud, Gehman and Giuliani, 2018). This means that ‘performativity can never be a settled state of affairs, but instead must be considered as an ongoing journey’ (Garud, Gehman and Tharchen, 2018, p. 503). Strategic reorientation (i.e., pivoting) is a central concept of venture creation, in which parts of the business model are reoriented in order to seek a better fit between evolving products and targeted customers (Grimes, 2018; McDonald and Gao, 2019). Therefore, performativity assumes the temporal view of entrepreneurial process, the narrative time, ‘beforing’, being, and becoming, as described in the following quote:

‘besides navigating emergent, complex, non-linear dynamics (becoming), entrepreneurs must also manage the temporary settlements and disruptions in the present (being), and the expectations and commitments that they had set and negotiated along the way (beforing)’ (Garud, Gehman and Giuliani, 2018, p. 62).

Packard (2018, p. 39) criticises this view of performativism as a ‘separate and stand-alone meta-theoretic foundation for entrepreneurship research [...] instead [he would] like to see performativity reconfigured in accordance with and atop an interpretivist foundation’.

This research adopts the interpretivist position, with some assumptions from the performative approach, as well as the process theoretical view of entrepreneurship (Packard, 2017), where the venture creation process is directed towards the pursuit of new value. However, value can be either economic or another type of value, such as sustainability. The three time horizons of performativity are ‘becoming’, referring to emergent identities; ‘being’, which refers to what actors confront in the moment; and ‘beforing’, or ‘the commitments and investments that [entrepreneurs] and others made given their earlier selves’ (Garud, Gehman and Giuliani, 2018, p. 62). This research views retrospective events (beforing), present events (being), and future events (becoming). The agency of entrepreneurship in a digital context is distributed, and social and material (digital) entities are co-constituted in the sayings and doings of heterogeneous actors, as in the case of framing in the business model disruption (Snihur, Thomas and Burgelman, 2018), where the company uses framing as a way of creating the future of the opportunity development, as with the case of Apple Computers in the structuration example in Section 4.1.2.

Table 4-4 Philosophic approach of interpretivism and performativity in entrepreneurship

	Interpretivism (Packard, 2017, pp. 542–544)	Performativity (Garud, Gehman and Giuliani, 2018, p. 62)	This research
Ontology	Physical entities are real, while social entities are not real but conceptual (nominalist)	‘Social and material entities are co-constituted in sayings and doings of heterogeneous actors and through the mangle of practice’	Relationship between entrepreneur and opportunity ‘as socially embedded constructs’ and are co-constituted in sayings and doings of stakeholders of venture creation process
Epistemology	Knowledge of physical reality, which entails the actions of others, is subjective, and derived from two sources: 1) empirical experience; and 2) imagination (anti-positivist/ rationalist)	‘Material and social entanglements shape how we know and so, constitute what we know’	Subjective and interpretive inner world of entrepreneur key mechanism, entrepreneurs can imagine beyond institutionalized constraints of existing environment with alternative social, economic, and political arrangements (Suddaby, Bruton and Si, 2015), examples are iPhone, framing, or creating new markets not yet

	Interpretivism (Packard, 2017, pp. 542–544)	Performativity (Garud, Gehman and Giuliani, 2018, p. 62)	This research
			existing (5G, block-chain)
Axiology (What is entrepreneurship, source of entrepreneurship)	Intentional pursuit of new economic value	‘Meaning making around multiple matters of concern implicating different kinds of values’	Value can be economic, but also different kinds of values (e.g. sustainable entrepreneurship)
Relationship between ontology, epistemology, and axiology	Multi-level	Flat	
Agency	Individualistic; individuals prefer the social legitimacy that conformity affords, entrepreneurs choose to conform expectations set by contexts	‘Distributed; agency is constituted by the socio-material networks that actors try and shape through their speech acts. Rather than choose to conform to, or deviate from expectations set by contexts, actors contextualize.’	Performative view, agency in digital, entrepreneurial context is distributed
Human nature	Voluntarism		Voluntarism
Methodology	Ideographic		Ideographic, as context is important
Entrepreneurial process	Becoming	Beforeing, being, and becoming	Performative view, this research looks at all phases (beforeing/retrospective, being and becoming)
Variance/process theory	Process theory		Process theory

The ontological position of this study is adapted from performativity and is defined as *the relationship between entrepreneur and opportunity ‘as socially embedded constructs’ which are co-constituted in sayings and doings of stakeholders of venture creation*. This means the social constructionist view is close to the assumptions of this research.

4.1.4 Research approach

The research approach can be deductive, inductive, or abductive. The deductive research approach tests specific premises, and if they are determined to be valid, the conclusions must also be valid (Saunders, Lewis and Thornhill, 2016). Because the deductive approach relates to finding generalisations from general to specific (Vaus, 2001; Bryman and Bell,

2011; Saunders, Lewis and Thornhill, 2016) and this research creates a framework of existing models, it is partially deductive.

Inductive reasoning means data collection is used to explore a phenomenon, identify themes and patterns, and create a conceptual framework (Saunders, Lewis and Thornhill, 2016). Saunders et al. (2016) argue that ‘many varieties of qualitative research commence with an inductive approach, where a naturalistic and emergent research design is used to develop a richer theoretical perspective than already exists in the literature’.

Thus, this research employs both deductive and inductive reasoning. First, the theoretical framework is built (deductive) and tested empirically. However, empirically collected data was used to build the framework, so this research is also inductive. The concept of abductive reasoning is used, when there is an interaction of specific and general in a way as coming back to the premises and redefine, for example the framework (Mantere and Ketokivi, 2013, p. 81), or ‘an abductive logic of inquiry is typically brought into play when we become interested in a class of phenomena for which we lack applicable theories’ (Friedrichs and Kratochwil, 2009, p. 714; Schwartz-Shea and Yanow, 2013, p. 28). *This research uses abductive logic* when there is a lack of applicable theories for venture creation in a digital context. The qualitative inquiry process redefines the theoretical framework created from earlier research (see Figure 3-2). The abductive logic of inquiry in interpretive research maintains that ‘researchers will learn more about their research question in the process of conducting their research’ (Schwartz-Shea and Yanow, 2013, p. 34).

4.2 Research design

This section outlines the research design for a study that is entrepreneurial and philosophically positioned as interpretative, exploratory, and descriptive.

Research design refers to ‘the plan for an entire qualitative research project’ (Myers, 2013, p. 19). A helpful analogy is an architect who needs to know the purpose of the building before designing it, ordering materials, making plans, or setting deadlines (Vaus, 2001). The data collection method is not enough, as ‘the issues of sampling, method of data collection, design of questions are all subsidiary to the matter of ‘What evidence do I need to collect?’ (Vaus, 2001). The research needs to be designed according to the type of social research – ‘exploratory, descriptive, explanatory, evaluative or a combination of

these' (Saunders, Lewis and Thornhill, 2016, p. 164) – as well as the philosophical positioning.

Interpretive research design (Schwartz-Shea and Yanow, 2013, p. 33) notes the surprise element and abductive reasoning; the researcher needs to attend and register the presence of surprise or a puzzle and have prior knowledge to be able mark something as surprising. New concepts, relationships, and explanations are created when the researcher examines these surprises and puzzles in the context of the theories.

4.2.1 Research strategy

A method of designing the research strategy called the research onion (Saunders, Lewis and Thornhill, 2016, p. 164) is helpful. Section 4.1 discusses the first philosophical position choice for this research. The second phase pertains to choosing the appropriate research methods: quantitative, qualitative, or mixed-method.

Quantitative research uses numbers and data to test theory (Bryman and Bell, 2011; Saunders, Lewis and Thornhill, 2016); the research settings elaborate theory, devise the hypothesis, and develop measures of concepts (Bryman and Bell, 2011). In early entrepreneurship, the research was positivist in nature and relied on quantitative methods (Suddaby, Bruton and Si, 2015). However, since entrepreneurship is a relatively new line of research, researchers have been calling for research methodologies, which have less physics envy, include more empirical research settings, and rely less on statistics (Bygrave, Churchill and Bygrave, 1989; Bygrave and Hofer, 1991). In entrepreneurship, there is a call for more field research studies with data and more longitudinal studies. For this reason, qualitative research can help provide an understanding of entrepreneurship as a phenomenon in its contextual setting (Patton, 1990; Leitch, Hill and Harrison, 2010). It includes in-depth studies and creative ways to produce and analyse the data (Hlady-Rispal *et al.*, 2014; Suddaby, Bruton and Si, 2015).

To this day, there is a discussion of whether entrepreneurship has found a legitimate framework or not; it has failed to develop 'indigenous theory, because it has failed to generate a defining theoretical question of "core puzzle"' (Kuhn, 1970; Suddaby, Bruton and Si, 2015, p. 1). In an answer to these critics, the qualitative research or 'qualitative lens' helps explain entrepreneurship as a phenomenon (Suddaby, Bruton and Si, 2015).

This research seeks to explore, describe, and find patterns with regard to how a digital technology start-up entrepreneur behaves in a complex and dynamic situation where the environment is continually changing and the risk of failure is ever present. Qualitative research is said to be associated with interpretive philosophy, because in order to achieve the aim of getting close to the participants, entering their world, and interpreting their realities appropriately, thick and rich descriptions of actual events in real-life contexts are needed (Leitch, Hill and Harrison, 2010).

Qualitative research uses a naturalistic approach that seeks to understand phenomena in context-specific settings, such as ‘real world setting [where] the researcher does not attempt to manipulate the phenomenon of interest’ (Patton, 1990, p. 39). Context in this research is essentially important, the choices of the entrepreneur depend heavily on the context where he or she is making them.

Some researchers are even arguing that instead of making the distinction between qualitative and quantitative research, there should be three types of research, as quantitative, qualitative, and interpretivism (Schwartz-Shea and Yanow, 2013), or come very close to this argument (Packard, 2017). This is discussed further in the next Section 4.2.2.

4.2.2 Entrepreneurship viewed as a process and as a journey

The research strategy needs to align with the research methodology, as well as the research aim (goal).

1. Process view of entrepreneurship

This research adopts the process view of entrepreneurship (see Section 2.2). The term ‘process’ in an entrepreneurial context has two meanings. The first relates to the process of entrepreneurship starting at one point (A) and ending at another (B), and in between a set of activities takes place. The second meaning is a ‘*process as a sequence of events or activities that describe how particular things happen or change over time*’ (Dimov, 2018a, p. 7). The process view of entrepreneurship adopts the latter meaning.

The performativity view of process (Garud, Gehman and Giuliani, 2018) notes that ‘change must be approached from within – not as an “abstract concept” but as a performance enacted in time’ (Tsoukas and Chia, 2002, p. 572). Since entrepreneurial process

studies are diverse with different views and methods, the presentation of a map of different academic stances of studying entrepreneurial processes (Dimov, 2018a), was helpful for choosing the research strategy of this entrepreneurial process research.

In the model, the research goal of understanding refers to descriptions that ‘make the actions of entrepreneurs intelligible, thereby delivering idiographic and evaluative knowledge, which naturally seeks to elicit what is different about each entrepreneur, to sense his or her specific circumstances, aspirations, and deliberations’ (Dimov, 2018a, p. 19). The interpretivist philosophical position favors the process-theoretic approach in entrepreneurship, with the intentionality of the founders, ‘becoming’ rather than ‘being’, and relationships and interactions rather than social entities (Packard, 2017, pp. 536–537). As the goal of this research is to understand the entrepreneurial process of early stage digital start-ups, it adopts the process theory approach.

Design science theory supports the view that the entrepreneurial process looks towards the future. This research is interested in how the process will look in its future phases, an example being the exit phase. The design science approach is used in business model literature on the business model canvas (Osterwalder, 2004), see Section 2.2.2.

The social ontology of Dimov’s model (Dimov, 2018a, p. 18) notes that entrepreneurs have different experiences, divergent ways of thinking, and varied motivation for entrepreneurship, so the social ontology dimension involves many different possibilities and journeys; these are divided into individual, cultural, and social dimensions.

The following quote expresses the process view of entrepreneurship:

‘In the process view, firms (or the individuals that comprise it) are continually evolving, searching for novel ways to recombine their collective resources toward higher productivity. Indeed, it might be understood that a firm is a continually reproduced norm or institution, its nature and form following institutional evolutionary processes.’ (Packard, 2017, p. 546)

The process theory approach uses the theories of venture creation process and the opportunity identification, evaluation, development, and exploitation process (theoretical framework of this study). Regarding the divide between natural and artificial, the natural is ‘something that has already happened and thus can be taken for granted’ and presents the retrospective stance of how to describe a process, whereas the artificial relates to ‘something that is not yet realized and is thus in the making’ (Dimov, 2018a, p. 20).

To study a process, there are many ways to conduct research, including processual analysis (Pettigrew, 1997); longitudinal research (Gatewood, Shaver and Gartner, 1995); case study method, real-time case analysis, or cross-sectional retrospective method (Van de Ven and Engleman, 2004); narrative sequence method (Abbott, 1990); event-driven or outcome-driven methods (Aldrich and Martinez, 2001; Van de Ven and Engleman, 2004); time based or event-based pacing methods (Gersick, 1994); and stages and cumulative evolution models (Van de Ven and Poole, 1995). The process view of entrepreneurship uses the event-driven study.

An interesting retrospective research related to this study is team building in demanding circumstances, using as an example the climbers in Mount Everest (Jacobsson and Hällgren, 2016). In the beginning stages of the venture creation, the team building can change rapidly, as an unexpected event, where the outcome is unknown and may cause an impromptu team building, where members are joining the team voluntarily, in contrast to assigned. The research using Mount Everest climbers and the impromptu team building is using theories of unexpected events. This explorative case study used books written retrospectively based on eyewitness accounts as research data. One of the conclusions of the research is the lack of attention to the situatedness and unexpected events in forming teams. The retrospective data made this type of research possible.

This research adopts the retrospective approach (natural) and the artificial view, as in the performative view of all phases (beforing/retrospective, being, and becoming) (Garud, Gehman and Giuliani, 2018).

2. Critical events

The process view of entrepreneurship sees it not as a particular event, outcome, or series of events, but instead as an unfolding process, where the pre-seen target is not known, and entrepreneurship is a chosen course of action (Packard, 2017, pp. 536–537). When looking at entrepreneurship as a journey circumstantial to time and space, each event is necessary to explain the outcome, and the entire chain of events is the explanatory unit (McMullen and Dimov, 2013). In other words, events and outcomes are interrelated, and on an entrepreneurial journey, each event is needed and important:

‘Each event on the path to the eventual outcome is necessary to explain that outcome... This is consistent with the entire chain of events being the explanatory unit’ (McMullen and Dimov, 2013, p. 1488).

The question of interest in this research is what kind of events have changed the way entrepreneurs proceed with their processes. This research calls these ‘critical events’, and in the literature they are also referred to as problematic experiences (Selden, Fletcher 2015b) or critical incidents (Kaulio, 2003; Chell, 2015). These events do not trigger a ‘transformational’ action or a ‘new pattern of emergence’; the problematic experience needs to be solved by transforming the business idea or starting the ‘transformational event’ before the new pattern of emergence can start (Selden and Fletcher, 2015). In other words, the entrepreneur needs to realise that there is a need for adaption of the venture idea before the development cycle initiates. Lichtenstein (2015) refers to the Pareto principle (20/80) and states that ‘the vast majority of instances have no influence on the dynamic system, but a few instances have tremendous leverage’.

Section 4.3 discusses the choice of methods.

The reasons for choosing qualitative research methods are as follows. This study

- needs to collect detailed views of digital start-up founders as data, and data are in the form of words;
- has an emphasis on the entrepreneurial process and how events unfold over time; and
- needs data from a context-specific process (digital, innovative, start-up, and location context).

4.3 Research methods

Research methods are the ‘techniques or procedures we use to collect and analyse data’ (King, 2018, p. 7). The research methods are based on the philosophical position(s) and the aim of the research. The philosophical position of this research is interpretivist, and the aim is to describe and understand the venture creation process of digital start-up. In order to conduct the study in a descriptive way, the data collection had to align with the philosophical positions; thus, qualitative research methods were chosen.

4.3.1 Collecting qualitative materials

This research needs a qualitative method which is able to capture both the process quality of the data and event-based data. In social sciences, interviews are a common research method for collecting qualitative material (Schwartz-Shea and Yanow, 2013, pp. 26–34).

With interpretivist research projects, the research question is often intimately connected with ‘a particular setting, a particular time period, and a particular set of actors’ (Schwartz-Shea and Yanow, 2013, p. 57), which is the case in this research, as well. The question, ‘*How do innovative digital technology start-ups conduct the venture creation process?*’ sets a scene, where the first task is to locate these kinds of start-up ventures, and the second task is to find someone from these start-ups to answer questions regarding their process of venture creation. Moreover, the ventures have to be in their early stages.

The second question relates to the type of qualitative materials needed for this research. Is one type of material enough, or should more data be collected by other qualitative methods and, if so, for what purposes?

1. *Choices of settings, actors, events and materials*

After setting the scene of innovative digital start-up founders in the early stages of their venture creation, the concept of ‘access’, or how to find and reach the needed informants, must be addressed. Access is understood ‘in the context of the relational character of engagements with research participant in the field’ (Schwartz-Shea and Yanow, 2013, p. 59). In this research, it meant finding a way to gain access to start-up entrepreneurs who were willing to set up a data collection meeting and establishing a relationship with them in a short period of time. The researcher found suitable events and locations where it was possible to meet start-up founders and get an appointment to conduct an interview. Additionally, the advantages of being at the location included greater access and thus enhanced understanding of the participants.

In the adapted abductive research approach, the successive phases of learning, reviewing existing literature, and having prior knowledge of the field provide insights, and if these

insights are not helpful, they are modified using the logic of inquiry (Schwartz-Shea and Yanow, 2013, p. 72).

The potential data collection methods for this research were limited by access; by the type of data needed (e.g., interpretivist assumptions; detailed, contextual, rich data); and by the aim of attaining generalisable results. Had this study chosen the case study method, specifically a multiple case study as in one 'cyberentrepreneurship' study with five cases (Carrier, Raymond and Eltaief, 2004), the sample would have been smaller due to access and time restraints, and the study would have been less generalisable. On the other hand, several more detailed data collection episodes would have been possible with the case study method.

Had the ethnography or participant observation been a chosen research method, the access, number of ventures, and location of the ventures of participants would have been smaller, perhaps restricted to one or two locations in Finland. Ethnography as a research method is a science used to describe a group or culture, and it searches for lived human experiences by observing and participating in the lives of participants, may involve participation of the researcher in the day-to-day lives or culture of the studied participants, and must be on-site or in a naturalistic setting (Sangasubana, no date; Burgess, 2002; Johnstone, 2016). Action research (Leitch, 2007), if chosen as a research method, would have also restricted the research to one venture and would have required a different research design, setting, and goals.

Entrepreneurial narratives as a qualitative research approach (Hjorth and Steyaert, 2004; Fletcher, 2007; Gartner, 2010) have been widely used in entrepreneurial research.

McMullen and Dimov (2013, p. 1505) suggest ways to study entrepreneurial journeys, one is selecting journeys that have been already completed, using extensive retrospective narratives, historical methods, and variety of data sources; the other is starting the research at present and building a real-time longitudinal study of the unfolding process using the Minnesota Innovation Research Program (MIRP) method. Studying entrepreneurial narratives was initially considered as a research method for this research, but it was later abandoned (see Section 4.10) because the analysis of entrepreneurial narratives (Holstein and Gubrium, 2011; Larty and Hamilton, 2011) could have posed problems due

to the fact that over 30 ventures were to be studied; thus, the narrative analysis would not be as appropriate as the semi-structured interview analysis approach. However, this research includes entrepreneurial narrative elements and uses a retrospective method, which is discussed in more detail later in this chapter.

In process studies, qualitative inquiry is a highly appropriate research method (Patton, 2002, p. 159) because it results in the detailed description of the process. The experiences of the process can be captured in participants' own words; as process is fluid and dynamic, summarising via a single rating indicator is not possible and the participants' perceptions are important data. Interpretivist inquiry can embrace the 'complex and dynamic quality of the social world and allow the research to view a social research problem holistically' (Leitch, Hill and Harrison, 2010, p. 70).

Qualitative inquiry is conducted via structured, semi-structured, or unstructured interviews (Whiting, 2008). Structured interviews generally use questionnaires with closed-ended questions; semi-structured interviews require a level of previous study, because the interview questions are based on prior knowledge, and the questions are formulated prior to the interview in an interview guide (Kallio *et al.*, 2016); and the unstructured or in-depth interview combines structure and flexibility, is interactive in nature, uses an interview guide, and is usually conducted face-to-face (Legard *et al.*, 2003).

The start-up venture creation process is complex, non-linear, and dynamic, so the idea that there is only one version of that reality is not adopted. Instead, this research adopts the interpretivist perspective with a qualitative data collection method, in order to collect information about participants' experiences, understandings, and choices in different situations. Therefore, qualitative inquiry in the form of interviews was adopted as a suitable data collection method.

It can be challenging to conduct rigorous and high quality interviews, as the interview research method may have obstacles (Kvale, 1994) or potential problems (Myers, 2013). When using interviewing as a data collection method, it is important 'not to oversimplify and idealize the interview situation, which is socially and linguistically complex' (Symon and Cassell, 2012, p. 245), but rather to study the limitations and ways to minimise the limitations beforehand.

In designing the interview, the key questions are who to ask (i.e., participant selection); what to ask (i.e., interview guide); and how to ask (i.e., interview practice) (Symon and Cassell, 2012). In addition, the interview location 'should be examined within the social context of the study being conducted and analyzed as an integral part of the interpretation of the findings' (Herzog, 2012, p. 207).

From the interpretivist perspective, the assumption is that there are multiple versions of reality, and the data generation method of semi-structured interviews enables participants to present their individual understandings and experiences (King, 2018, p. 17). Semi-structured interviewing is closely associated with interpretivism, as 'it reflects an ontological position that is concerned with people's knowledge, understandings, interpretations, experiences, and interactions' (Mason, 2004, p. 3).

This research uses qualitative, semi-structured interviews which include event-based, narrative elements. The term 'elements' is used here because the inquiry was neither solely event-based nor based on a narrative research method. Instead, the narrative element arose organically while interviewing start-up founders. The interviewees often began telling narratives, even when they were asked semi-structured questions (Webster and Mertova, 2007). Since the goal of the study is to understand the process, the questionnaire includes a question about critical events to emphasise the event-based element of the process.

2. Collection of additional qualitative materials, observation field notes and internet sources as data

Researchers can broaden the repertoire of process methods by using interviews, observations, and internet resources (Ott, Eisenhardt and Bingham, 2017). In a study on strategy formation in entrepreneurial settings, the researchers suggested that future research 'improve depth by using a richer mix of data types, including traditional sources like interviews and observations as well as contemporary sources like online videos, blogs, and websites (Eisenhardt, Graebner and Sonenshein, 2016; Ott, Eisenhardt and Bingham, 2017, p. 321). Additionally, data gathering via field or observation notes provides material for researcher sense-making (Schwartz-Shea and Yanow, 2013, pp. 89–90).

In a high-tech start-up longitudinal single case study (Clarysse and Moray, 2004), field notes were written throughout the day regarding observations on the premises of the company. Another example of using field notes, in a grounded theory gaming industry study on 20 start-ups across 19 countries in an accelerator (Roshan Kokabha, Tuunainen and Hekkala, 2019), field notes were taken after each interview to gain richer data.

In order to improve the validity and depth of the interview data, additional qualitative data were gathered in the form of observation field notes and data collection from internet sources.

3. Participant selection

The question of who to ask is an important one for this research. Critics of qualitative research claim that when a qualitative method is used it can be inconsistent, particularly when sampling of units of analysis (Vanderwerf and Brush, 1990). In order to attain sample comparability, at the very least, the reasons for sampling should be made explicit. Sampling in entrepreneurial settings has a profound effect on the quality of research findings (Neergaard and Ulhøi, 2007).

In this research, the theory-driven approach for sample strategy is appropriate because this research uses a theoretical framework created from synthesis of the literature review findings (Neergaard and Ulhøi, 2007). It adopts a purposeful sample strategy- or criterion-based sampling (Ritchie and Lewis, 2011) because the sample has to meet specific criteria. This means the research participants are not randomly selected; instead, they are sampled in order to assure relevance to the research questions (Bryman and Bell, 2011, p. 433) and are information-rich start-ups (Patton, 1990, p. 169) for the purpose of this research. This research also adopts the opportunistic sampling strategy, where ‘the researcher is able to take advantage of unforeseen opportunities as they arise during the course of fieldwork’ (Ritchie and Lewis, 2011, p. 81). The reason for this choice is that the start-up events offer an opportunity to meet the founders who match the sample criteria, but they are not known or chosen beforehand.

The selection criteria may need to be prioritised if there are too many criteria (Ritchie and Lewis, 2011, p. 98), as is the case in this research.

4. *Sample size and saturation*

The question of sample size is relevant, as the research had to be budgeted and planned in advance. The idea of the saturation point is ‘helpful at the conceptual level, [though] it provides little practical guidance for estimating sample sizes’ (Guest, Bunce and Johnson, 2006, p. 59). Moreover, the problem of how the saturation point is measured or operationalised is a difficult one. In a non-probabilistic, qualitative study using semi-structured, open-ended interviews and purposive sampling, data saturation is defined as ‘the point in data collection and analysis when new information produces little or no change to the codebook’ (Guest, Bunce and Johnson, 2006, p. 65). In this study by Guest et al. (2006, p. 65), the test of six first transcripts was done and the results were as follows:

- The identification theme (the codebook structure) was created and refined after each set of six interviews and 10 analysis rounds
- The interviews were analysed with the content-driven codes
- 73 % of the codes were identified within the first six transcripts, and after 12 interviews, 92 % of the codes were developed

In this study, the saturation point was reached quite early. The number of participants in the sample depends on ‘how you want to use your data and what you want to achieve from your analysis’ (Guest, Bunce and Johnson, 2006, p. 76). In addition, ‘the more similar participants in a sample are in their experiences with respect to the research domain, the sooner we would expect to reach saturation’ (Guest, Bunce and Johnson, 2006, p. 76).

Another aspect to consider when deciding the sample size and who to interview, is the ‘time and resources needed to conduct interviews with both individual members and the couple/family/group together’, as large group interviews are difficult to organise (Beitin, 2012, p. 34). More practical advice for the sample size comes from the UK education recommendation (in psychology) for the sample size of interviews of PhD research, when the thematic analysis data of the whole project is 30+ interviews (Terry *et al.*, 2017, p. 22), see Table 4-5.

Table 4-5 Project sample size recommendations (Clarke and Braun, 2013; Terry et al., 2017, p. 22)

	Interviews	Focus groups	Qualitative surveys	Story completion tasks	Media texts
Undergraduate or Honors project	6-10	2-3 (4-8 participants in each group)	20-30	20-40	1-100
Masters or Professional Doctorate project	6-15	3-6	30-100	40-100	1-200
PhD/larger project (Thematic Analysis TA data as only a part of the whole project)	15-20	3-6	50+	100+	4-400
PhD/larger project (TA data as whole project)	30+	10+	200+	400+	4-400+

For the purposes of this research, a sample size of 30+ and testing of the themes with a pilot interview round was chosen.

5. Interview guide and interview protocol

The interview guide is different from quantitative survey research because flexibility is the key requirement in a qualitative interview. The interview guide outlines the main research topics and allows the participant to lead the interaction ‘in unanticipated directions’ (King, 2018, p. 63). The interview guide should be adopted after the pilot interview round and when the interviews show, in practice, that something is missing or needs to be asked in a different way. The interview guide includes the following types of questions: background/demographic, experience/behavior, opinion/values, feeling and knowledge questions (King, 2018, p. 65). It ensures that same basic types of questions are asked of each person interviewed (Patton, 2002, pp. 343–345). Interview guides can be more or less detailed and provide a question included in the framework of the study.

Interview protocol refers to the way the interview is carried out. A suggestion for interview protocol is to divide the interview into three segments: opening, middle, and concluding (Galletta, 2013). The following paragraphs explain the contents of these segments.

Opening segment: be appreciative to the participant agreeing to the interview; state the purpose of the interview; consent forms must be explained and signed before the interview begins; obtain consent to record the interview. The initial questions should be open-ended and create space for the participant to talk about the topic (in this case their business idea). Asking broad questions at first gives more room for different kinds of answers.

Middle segment: using the knowledge acquired at the beginning of the interview, ask the participant for more detailed information about their venture; include more complex question topics.

Concluding segment: ask clarifying questions; inquire about topics that were not covered in the interview; include questions drive towards completing the interview; thank the participant for the interview (Galletta, 2013, pp. 45–53).

The interview guide and protocol are in **Error! Reference source not found..**

6. Interview location and format

Semi-structured interviews can be face-to-face or online. With face-to-face interviews, an important component is who chooses the location, the logistics of the location, and how to create a comfortable atmosphere. The location should be chosen based on the sensitivity of the interview (Herzog, 2012). Online or remote interviews are collected via remote video conferencing, which includes audio and visual inputs (King, 2018, p. 115). Face-to-face interviews were conducted for this research, whenever possible, and online interviews were utilised when a physical meeting was not possible. Video interviews are not new, they have been conducted for PhD research (Deakin and Wakefield, 2014), where Skype enabled more flexibility in organising the interviews.

Interviewees are more likely to feel comfortable in their own surroundings, and they should be allowed to choose the location. Furthermore, the location should be a place to talk freely. The interaction between the interviewer and the participant is key (Herzog, 2012).

Online interviews can be synchronous or asynchronous. Synchronous interviews are similar to face-to-face interviews, only online; asynchronous interviews are not in real time (James and Busher, 2012). This research used synchronous, one-on-one online interviews.

The challenge with online semi-structured interviews is ‘how to develop the research relationship online’ (James and Busher, 2012, p. 16); thus, before starting the actual interview, there should be some small talk to warm up and ensure that the connection works well enough to conduct the interview. Moreover, the ‘interviewer is deprived of information about the interviewee’s circumstances as they participate in the study’ (Evans *et al.*, 2008, p. 49), which is important to keep in mind, for example if there are interruptions or technical problems.

7. Time horizon and number of research episodes

The time horizon can be cross-sectional or longitudinal. Cross-sectional refers to a ‘snapshot’ of a particular phenomenon, and longitudinal refers to a ‘diary’ with events taking place at different times, as in studies of change and development (Saunders, Lewis and Thornhill, 2016, p. 200). This study examines the process of venture creation in retrospect (i.e., what has happened so far), but it also looks to the future. This research uses a single research episode and retrospective qualitative inquiry.

Mason and Harvey (2013, p. 3) argue that it is ‘only by looking at opportunity backwards from the vantage point of the unfolded – and already known – future that it is possible to speak of discovery, recognition and identification of opportunities’. For this reason, it is important to analyse the opportunity development process retrospectively.

Early on, it became evident that to be able to conduct nearly 40 interviews of start-ups from the chosen ecosystems, conducting an interview with each start-up could occur only once; thus, the method had to be chosen accordingly. A single episode of research fieldwork can be used in qualitative research, even if there is a dynamic and changing quality studied (Ritchie and Lewis, 2011, p. 53). Because qualitative research ‘involves probing and clarification, fairly detailed retrospective accounts can be collected’. Another way is through sample design, using samples from different stages of the venture creation process.

Retrospective data is collected for the ‘means of measuring change for either descriptive or explanatory purposes’ (De Vaus, 2006, p. 3), and if data were not collected about past patterns at the time, ‘there is little alternative to using retrospective data to explore pat-

terms of change' (De Vaus, 2006, p. 5). Retrospective data collection has been used in entrepreneurship studies researching pathways to successful entrepreneurship (Schmitt-Rodermund, 2004); the effect of early entrepreneurial competence in adolescence (Obschonka *et al.*, 2011); predictors of adults' entrepreneurial intentions; career motivations of nascent entrepreneurs (Carter *et al.*, 2003); opportunity recognition in the form of meaningful pattern detection; and novice versus experienced entrepreneurs (Baron and Ensley, 2006).

Context is important in this research, and the context includes the time and space continuum. Time has many dimensions, including chronological time (e.g., year, month, day) and an experienced length of time. As this research contains narrative elements, time needs to be discussed because it is 'subjective and is experienced and enacted in different ways by different people' (Cunliffe, Luhman and Boje, 2004). This research collects data on a single research episode, and the data gathering is retrospective, present, and future-oriented.

4.3.2 Analysis of data and interpreting qualitative material

The analysis of the interview needs to be thought out before starting the interviews so that, when the interview is conducted, one step of the analysis has already started. There are steps that help with the subsequent analysis (Kvale, 2007). These steps describe how, already during the interview, it is possible to condense and interpret the meanings by either the participant discovering new relationships or the interviewer describing and sending back the meaning and testing if the meaning is correct or not; this is known as a 'self-correcting interview' (Kvale, 1994).

A table of the fundamentals of qualitative data analysis (Miles and Huberman, 1994; Miles, Huberman and Saldaña, 2014)² was created to present the different tasks involved and discussed (see Table 4-6).

² Google Scholar citations #96 562 (28 January 2019)

Table 4-6 Fundamentals of qualitative data analysis adopted

		Task	Application and references	Chapter/ Section
1		Data processing and preparation	List of tidying the data (LeCompte, 2000, p. 148)	4.5.1.
2	CODING	First-cycle codes and coding	Section 4.5.2, NVivo (Bazeley and Jackson, 2013, pp. 68–121; Silver and Woolf, 2017, p. 88), theory (Miles, Huberman and Saldaña, 2014, p. 71), coding manual (Saldaña, 2015, p. 45), (Guest, MacQueen and Namey, 2011, pp. 49–78)	4.5.2.
3		Second cycle coding: pattern codes	(Saldaña, 2015, p. 149), (Miles, Huberman and Saldaña, 2014, p. 86), themes & theoretical models (Guest, MacQueen and Namey, 2011, p. 75)	4.5.3.
4	ANALYSIS	Jottings (analytic sticker notes)	(Miles, Huberman and Saldaña, 2014, p. 93)	4.5.3.
5		Analytic memoing (writing out loud)	(Saldaña, 2015, p. 32), (Miles, Huberman and Saldaña, 2014, pp. 95–98)	4.5.4.
6		Assertions and propositions	(Miles, Huberman and Saldaña, 2014, p. 99)	5
7		Closure and transition	(Miles, Huberman and Saldaña, 2014, p. 104)	5

In qualitative data analysis, clear rules and procedures do not exist, unlike quantitative analysis techniques (Ritchie and Lewis, 2011, p. 200). Instead, the study approach is the criteria for the chosen analysis method. Examples of the key features include status of the data (e.g., the phenomena under the study); primary focus of the analysis (e.g., focus on language as in discourse analysis, or in conversation, and some forms of narrative analysis); the way data is reduced (e.g., field notes, phenomenology, thematic summaries, descriptive accounts); the kinds of concepts generated (e.g., identification of key themes, grounded theory); how concepts are applied to the data (e.g., cross-sectional and non-cross-sectional, case studies, narratives, and biographies); how analysed data is accessed and displayed (e.g., ways to display data, accounts, and memos of analysis process); explicit level of abstraction (e.g., narrative analysis subjective experience, naming, and when classifying is not enough); and status of categories and the logic of explanation (e.g., categories as ways of grouping, displaying, and discussing data thematically) (Ritchie and Lewis, 2011, pp. 202–206).

In general terms, qualitative data analysis methods can be divided into two kinds of analysis: those interested in the language or how the language is used, and those interested in the content, or what the participants say (King, 2018, p. 192). This research is more interested in the participants' remarks, the content, than the actual language they use when saying it. The terms start-up founders use are not academic, and this research seeks to understand the venture creation process, not the vocabulary used. An example is the concept of a 'business model'. Many founders do not use this exact term but refer to the same concept. Since the overall meaning is more important than the exact terms used, content analysis was not adopted.

Discourse analysis is used to analyse the text in context (Leitch and Palmer, 2010) through a critical discourse analysis method (Alvesson and Kärreman, 2000; Fairclough, 2013) or in critical realism studies (Fairclough, 2005). Critical discourse analysis is not considered suitable for this study, because it focuses on social problems and associated power dynamics (Leitch and Palmer, 2010).

The chosen data collection method of semi-structured interviews provides a guideline as to what type of data analysis method is suitable. The analysis of semi-structured interviews discusses interpretive waves and thematic patterns as codes (Galletta, 2013, p. 126),

Thematic analysis is a way of 'identifying what is common to the way a topic is talked or written about and of making sense of those commonalities', as well as a 'method for systematically identifying, organising, and offering insight into patterns of meaning (themes) across a data set' (Braun and Clarke, 2012, p. 57). Thematic analysis was chosen for this research because 'it offers a way into qualitative research that teaches the mechanics of coding and analyzing qualitative data systematically, which can then be linked to broader theoretical or conceptual issues' (Braun and Clarke, 2012). Thematic analysis is flexible and can be conducted in many ways; this suits the needs of this research, which includes the creation of a new theoretical framework.

1. Thematic analysis of interview data

Thematic analysis can be conducted in many ways. Therefore, a number of choices have to be made in order to determine a suitable type of thematic analysis, and the researcher

has to understand and give reasons why a particular type was chosen (Braun and Clarke, 2006). The different types are inductive versus deductive; theory-driven; experiential versus critical orientation (Braun and Clarke, 2012); and exploratory, explanatory, confirmatory, and comparative analyses (Guest, MacQueen and Namey, 2011, pp. 35–40).

The exploratory analysis approach of primary data is a content-driven, inductive, bottom-up application, and is driven by what is in the data, as well as the origins of the codes and analysis. This method is usually associated with exploratory or grounded theory research. The deductive approach is top-down, which means codes and themes come from concepts and ideas from the researcher. Coding and analysis are usually conducted in both approaches, as in the case of the explanatory applied thematic analysis (also known as conceptual qualitative analysis).

Table 4-7 describes the process of thematic analysis in phases of descriptive coding, interpretive coding, and overarching themes, as well as the phases included in the three stages and their description. Quality checks occur throughout the process.

Table 4-7 Phases in the process of thematic analysis (Braun and Clarke, 2006, p. 87; King, 2018, p. 204)

	Phase	Description of the process		
Stage one: descriptive coding	1. Familiarising with data	Transcribing, reading and re-reading the data, noting down initial ideas	Read through transcript Highlight relevant material and attach brief comments	Quality checks at any stage of the process
	2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.	Define descriptive codes Repeat for each transcript, refining descriptive codes as you progress	
Stage two: interpretive coding	3. Searching for themes	Gathering data and collating codes into potential themes.	Cluster descriptive codes	
	4. Reviewing themes	Checking the themes in relation to the coded extracts and the entire data set, generating a thematic 'map' of the analysis.	Interpret meaning of clusters, in relation to research question and disciplinary position Apply interpretative coded to full data set	
Stage three: overarching	5. Defining and naming themes	Ongoing analysis to refine each theme and generate clear definitions and names for each theme.	Derive key themes for data set as a whole, by considering interpretive themes from theoretical	

	Phase	Description of the process		
			and/or practical stance of the project	
	6. Producing the report	Selection of vivid, compelling text extracts relating to the analysis to the research questions and literature, producing a scholarly report.	Construct diagram to represent relationships between levels of coding in the analysis	

2. First and second cycle coding, coding tree, and coding scheme

The concerns of the coding practices are reliability and unitisation. The reliability issues in coding are stability (if the coder's use of codes changes over time) and accuracy, meaning that the basic coding scheme and the newly developed codes are compared to the original. The unitisation problem relates to 'identifying appropriate blocks of text for a particular code or codes' (Campbell *et al.*, 2013, pp. 295–297). When coding semi-structured interviews, the coder needs enough background knowledge of the subject to be able to capture the meanings of the interviews.

The aim is to create a structured coding system from the beginning (Guest, MacQueen and Namey, 2011, p. 55; Bazeley and Jackson, 2013) by developing a coding scheme (codebook)(Guest, MacQueen and Namey, 2011, p. 57; Campbell *et al.*, 2013, p. 299). When using coding software, a coding tree is created in NVivo this means from the nodes into a tree (Bazeley and Jackson, 2013, p. 97). The idea of the coding tree is to create order from chaos, bring clarity to concepts, and help identify patterns (Bazeley and Jackson, 2013). For an example of a coding tree, see (Guest, MacQueen and Namey, 2011, p. 257)

The coding is divided into two stages. The first cycle is the process of initial coding using theming, and the second cycle includes classifying, prioritising, integrating, synthesising, abstracting, conceptualising, and theory building (Saldaña, 2015). This research uses first- and second-order themes (Gioia, Corley and Hamilton, 2013).

In the first cycle, coding methods including attribute, structural/holistic, descriptive (for field notes), and in vivo coding (Manning, 2017). The appropriate coding method for this research aligns with the thematic analysis method. A list of general criteria is presented (Saldaña, 2015, pp. 50–51), and a suggestion of structural coding as starting organising the data around research questions, and descriptive coding as methods to start with.

For the second cycle of coding, the idea is to define and name themes (Braun and Clarke, 2012, p. 66). Pattern coding is applied in the second cycle (Saldaña, 2015, pp. 152–155) to look for patterns in the venture creation process.

4.4 Limitations and ways to minimize effects of chosen research methods

This section discusses the limitations of the chosen research methodology, as well as how to minimise these effects and ensure quality of the interview data and data analysis. It first investigates the underpinnings of the qualitative and interpretivist research method, followed by the limitations of data collected via qualitative semi-structured interviews with retrospective, one research episode, field notes and internet sources as data collecting methods.

4.4.1 Underpinnings of qualitative and interpretivist research

The limitations of qualitative interpretivist research are 1) the problem of biases and predispositions of the researcher (Patton, 2002) and researcher presence and objectivity (Schwartz-Shea and Yanow, 2013, p. 95; Miles, Huberman and Saldaña, 2014, p. 296); 2) the problem of generalisability (Lewis and Ritchie, 2003; Bryman and Bell, 2011, p. 414); 3) the lack of standardised procedures (Wigren, 2007; de Kleijn and Van Leeuwen, 2018) for the researcher to rely on; 4) the questions of validity, reliability, and credibility (Altheide and Johnson, 2011, p. 588; Ritchie and Lewis, 2011, p. 273); the question of the quality (Wigren, 2007); and 5) the lack of transparency (Bryman and Bell, 2011, p. 414). This is not an exhaustive list, but it covers the underpinnings most often discussed in the literature.

The researcher's bias, predispositions, and credibility in qualitative research means that since the researcher is the 'instrument' of the research, and is present and involved in the research settings, they bring along their previous experience, knowledge of the subject, funding, and circumstances that may affect the data collection, analysis and interpretation (Patton, 1999). Bias is innate to single methods, single observers, and single-theory studies (Patton, 2002, p. 555). The confirmation bias problem in qualitative research refers to the researcher's intentional search for confirmation of the evidence (Schwartz-Shea and Yanow, 2013, p. 96).

A generalisability problem results from the fact that qualitative research is context-specific, and the number of research participants may be low, so the critique is that one case cannot represent the whole phenomena, and thus, the scope of the findings is restricted (Bryman and Bell, 2011, p. 414). The term 'generalisability' has a variety of meanings, and it is questionable whether qualitative research findings are generalisable or not (Lewis and Ritchie, 2003). Typically, generalisability refers to 'whether the findings from a study based on a sample can be said to be of relevance beyond the sample and context of the research itself' (Lewis and Ritchie, 2003, p. 261) and can relate to either empirical or theoretical generalisations. The empirical (external validity or transferability) is referring to either 'generalizing to the population from which the sample is drawn or generalizing to other settings and contexts' (Lewis and Ritchie, 2003, p. 264). Theoretical generalisability refers to how the theories are generalisable to a larger context; some earlier researchers even called for universal generalisations of causal relationships (Kaplan, 1964; Lewis and Ritchie, 2003).

In qualitative research settings, neither standardised procedures (de Kleijn and Van Leeuwen, 2018) nor agreed-upon quality standards exist (Wigren, 2007, p. 384). This means each study is designed according to the needs of the research and its meta-theoretical assumptions.

With regard to the question of validity, researchers doubt qualitative research findings because they lack the criteria for validity that exists in positivist research (Maxwell, 1992). Underpinnings of validity could be linked to sample coverage, capture of phenomena, identification or labelling, interpretation, and display of findings (Lewis and Ritchie, 2003, p. 274). The weaknesses of a qualitative field study are the anecdotal quality, as researchers report only a few examples of the instances of the behavior; researchers seldom providing the criteria or grounds for why some instances are included in the study and others are not; and the materials upon which the analysis is based not being provided (Bryman and Bell, 2011; Silverman, 2013). Threats to the reliability of the qualitative research are participant error, participant bias, researcher error, and researcher bias (Saunders, Lewis and Thornhill, 2016, p. 203). A lack of transparency results in not knowing what the qualitative researcher has done or how they arrived at their conclusions (Bryman and Bell, 2011, p. 414).

4.4.2 Underpinnings of semi-structured, retrospective interviews

The limitations of interviews include 1) the problem of power, 2) the problem of truth and authenticity, 3) the problem of consent, and 4) the problem of the interview and the project of the self (Nunkoosing, 2005). Although these limitations were recognised in the healthcare field, they can be viewed as entrepreneurship research limitations, as well, with some nuances. In healthcare, the researcher may be a representative of the healthcare profession, whereas in the field of management and business studies, this is not the case.

The problem with power in the interviews means that the interviewer has authority as a seeker of knowledge and has expertise with regard to the research and methodology (Nunkoosing, 2005, p. 699). In the worst case scenario, the interview can become exploitative and resemble an interrogation or confession.

In the interview situation, the interviewee can construct their story in any way they want. Additionally, the researcher constructs the stories with the interviewee in some contexts, in which case the story is authentic but not necessarily true (Nunkoosing, 2005, p. 701).

The problem with consent arises when, during the interview, an unexpected story emerges, and the story of the interview is not always under the control of the speaker (Nunkoosing, 2005, p. 703). The problem with the interview and the project of the self is the dilemma that the research project and the researcher are part of an academic institution, and the research project may have additional agendas which cause the researcher to have filters or 'maintain the acts that constitute the interview' (Nunkoosing, 2005, p. 704). The quality of the interview data may pose a problem because it can often be taken as a 'tacit assumption rather than an empirically verified assertion'. However, the trustworthiness of the transcripts is a fundamental component of the rigor of qualitative interview research (Poland, 1995).

The use of retrospective data gathering may pose several response bias problems. First, studies using the case study method or using archival data for empirical studies of entrepreneurship over time may cause bias, which can result when outcomes are known (Singh, 2001). Second, the criticism for retrospective methods is that they are likely to lead to errors and biases because respondents want to bias the results for various reasons

(e.g., failure). Third, 'memory is a subject to considerable distortion and change over time' (Baron and Ensley, 2006, p. 1342) and thus has to be interpreted with caution.

4.4.3 Ways to minimise limitations and ensure quality

In order to minimise the effects of limitations of interpretivist research in entrepreneurship, Leitch and Hill (2010) suggest a shift from the validation of the research as an outcome to be replaced with *validation as a process*. The symbolic interactionist perspective views evidence as process, and the evidence is seen as 'a part of the communication process that symbolically joins an actor, an audience, a point of view, assumptions, and claims about the relations between two or more phenomena' (Altheide and Johnson, 2011, p. 583). The validity of the qualitative data within the interpretative paradigm is 'on the process of investigation and communicating that process, the problems and solutions encountered in accessing, collecting analysing and interpreting data' (Altheide and Johnson, 2011, p. 593).

A standardised process of articulating the decisions made and the underlying principles explained allows readers to evaluate the quality of the research (de Kleijn and Van Leeuwen, 2018, pp. 259–260). The trustworthiness of the research can be enhanced by using four criteria: credibility, transferability, dependability, and confirmability (Shenton, 2004, p. 73). Credibility includes the adoption of appropriate research methods, such as iterative questioning, negative case analysis, peer scrutiny of project, use of reflective commentary, member checks, qualifications and experience of researcher, and examination of previous research. Transferability refers to background data for the context of study and a detailed description of the phenomena in question to allow for comparisons. Dependability arises from an in-depth methodological description that allows the research results to be scrutinised, and conformability refers to triangulation, admission of researcher's beliefs and assumptions, recognition of research method limitations, and demonstration of an audit trail.

To improve validity in qualitative research with positivist assumptions, triangulation (lens of the researcher), member checking (lens of the participants), and the audit trail (lens of the external reviewers and readers) are suggested as a procedures (Creswell and Miller, 2000, p. 126). Although this research is closest to the social constructivist view, it adopts

the audit trail as a way to improve quality of the data analysis process because it is a way to enhance the transparency of the process. The audit trail means that researchers provide valid documentation of the research process decisions and activities, which can be done via journaling and memos, keeping a research log, creating data-gathering chronology, and clearly documenting the data analysis procedures (Creswell and Miller, 2000, p. 128).

The problems with the interview noted in the previous section can be minimised by remembering that the 'interview is not the end of the research process' (Nunkoosing, 2005, p. 701); the data should triangulated and checked with other methods.

The quality criteria in qualitative research regarding credibility are rigorous methods, credibility of the researcher, and philosophical belief in the value of qualitative inquiry and triangulation (Patton, 2002; Wigren, 2007, p. 385). The quality criteria vary according to the philosophical stance. In research with a social constructivist view, the suggested criteria are triangulation, reflexivity, generalisability in praxis, and strength of evidence in particularity (doing justice to the integrity of unique cases; (Denzin, 2001; Wigren, 2007, p. 386). Triangulation is a method where research use multiple sources of information and data to form themes or categories in the study. The term originates from military navigation where sailors triangulated among different distant points to determine their ship's position (Kvale, 1987, 1994).

The biases and predispositions of the researcher can be addressed by using multiple data collection techniques and a form of triangulation. Triangulation means that 'no single method ever adequately solves the problem of rival explanations' (Patton, 2002, p. 555). Furthermore, there is a need to utilise at least two types of data analysis tools as a way to triangulate results, and the triangulation involves 'the use of multiple data sources, multiple researchers, multiple theoretical perspectives, and/or multiple methods' (Leech and Onwuegbuzie, 2007, p. 579). Using multiple methods and multiple analyses can reveal different aspects of empirical reality.

Generalisation of qualitative research is viewed in terms of circumstances that make generalisation possible, representational generalisation, appropriate use of evidential base, display of analytic routes and interpretation, and research and conduct (Lewis and

Ritchie, 2003). Reflexivity is 'an awareness of the researcher's role in the practice of research, and the way it is influenced by the object of the research' (Haynes, 2012, p. 72). The questions asked in reflexive research relate to the motivation for the research, the assumptions the researcher brings, how the researcher is connected to the research (e.g., in theoretical, experiential, and emotional ways), and how this affects the approach (Haynes, 2012, p. 78).

Table 4-8 lists the chosen methods for minimising the shortcomings of this research using qualitative, semi-structured, retrospective, interpretivist inquiry as the research methodology.

In summation, this research adopts multiple data collection techniques, triangulation, and audit trail as ways to improve its validity. The data collected from internet sources are used for triangulation purposes, and an audit trail is used to communicate the process of investigation. Reflexivity as researcher's quality assessment is adopted.

Table 4-8 Methods of minimising limitations of qualitative, interpretivist interview research

	Problem	Method to minimize effects	Explanation	If used how, if not why	References
QUALITATIVE AND INTERPRETIVE	Biases and predispositions of the researcher, too subjective research	Using multiple data collection & analysis techniques, triangulation of sources, and data analysing methods	Checking consistency of findings generated by different data collection methods, using multiple analysis to review findings, checking consistency of different data sources within same method, three sources of qualitative data: interviews, observation field notes, internet sources	Interview data, observation field notes, internet sources as data sources collected, thematic analysis for interview data, and fact checking for observation field notes and internet sources (maybe thematic)	(Patton, 2002, p. 555; Leech and Onwuegbuzie, 2007; Miles and Huberman, 2014, p. 296)(Bell, Bryman and Harley, 2011, p. 414; Schwartz-Shea and Yanow, 2013, p. 95)
	Generalizability	generalization and circumstances to make it possible, representational generalization	sample coverage, capture of phenomena, identification or labelling, interpretation, display	purposeful sample, continuous questioning: am I accurately reflecting the phenomena of venture creation process of digital start-up as perceived by the study population?	(Lewis and Ritchie, 2003, 2003, pp. 263–286; Bell, Bryman and Harley, 2011)
		appropriate use of evidential base	original data, well collected data set, diversity in nature not number	original data as evidence, diversity in phase, geography, industry, gender, type of industry	(Lewis and Ritchie, 2003, pp. 277–279)
		display of analytic routes and interpretation	level of classification, assigning meaning	higher level classification, more generalizable, more own meaning of researcher, less generalizable	
		research and conduct	full description of design and conduct of research, limitations	reporting, audit trail, including limitations (e.g. access)	
	No standardized procedures	Reporting Audit trail Researcher quality assessment (reflexivity)	Validation of process, providing good documentation of research process (decisions, activities, problems, encountered, collecting and interpreting data) via journaling and memoing, keeping a research log, creating data gathering chronology, and writing down data analysis procedures clearly, make interview setup explicit, step-by-step record of how analysis has progressed from start of process to final form, researcher assessing her biases at early stage of process	reported in observation field notes, audit trail adapted, written memos produced, researcher bias assessment in chapter 7 (discussion), reflexivity discussion, also in my journey of methodology	(Koch and Harrington, 1998; de Kleijn and Van Leeuwen, 2018)
	Quality of research Validity, reliability, and credibility				validation of process (Leitch, Hill and Harrison, 2010), reporting, audit trail (Creswell and Miller, 2000, p. 128; Lewis and Ritchie, 2003; Altheide and Johnson, 2011; Potter and Hepburn, 2012, p. 557; King, 2018), reflexivity (Haynes, 2012)

	Problem	Method to minimize effects	Explanation	If used how, if not why	References
	Lack of transparency	Reporting Audit trail	make interview setup explicit, step-by-step record of how analysis has progressed from start of process to final form	reported in observation field notes, audit trail adapted, written memos produced in audit trail	(Potter and Hepburn, 2012, p. 557; King, 2018)
INTERVIEWS	Power and authority of researcher	Researcher quality assessment, reflexivity, voluntary participation	participants do not have to tell anything they do not want to	researcher bias assessment in chapter 7, discussion, also in my journey of methodology	(Nunkoosing, 2005)
	Consent of revealing too much				
	Truth	Triangulation	Checking consistency of findings generated by different data collection methods	Comparing interview data and internet sources	(Singh, 2001; Patton, 2002, p. 556; Nunkoosing, 2005; Baron, 2006; Leech and Onwuegbuzie, 2007)
	Retrospective data				
DATA ANALYSIS	Quality of interview data	Researcher decisions reported, field notes and observational data	researcher's decisions what to include and how to do so must be informed by theoretical stance and empirical focus of the study, use of field notes and observational data	Decisions included with theoretical stance and empirical focus Observation field notes collected, transcriptions of interviews using intelligent verbatim style	(Poland, 1995, 2011)
	Validation of process of data analysis	Internal validation, constant comparative method, validation for generalizability	begin analysis on relatively small part of data, test out emerging hypothesis by expanding data set, checks against evidence and other sources before finding generalizations		(Lewis and Ritchie, 2003, pp. 275, 278; Silverman, 2011, p. 376)

4.5 Summary of research methodology and design

The methodological choices of this research are summarised in Table 4-9, using the research onion as the basis (Saunders, Lewis and Thornhill, 2016). The table presents the research philosophy, methodological choices, research approach, research strategy, time horizon, and techniques and procedures with the literature cited in earlier chapters.

During the positivist era, entrepreneurship research needed a 'solid foundation from social sciences research', which included the hypothesis and model construction (Bygrave and Hofer, 1991, p. 13). Since then, entrepreneurial research has called for less physics envy research methods (Bygrave, Churchill and Bygrave, 1989), and qualitative research has become part of the discipline. This empirical research is on the entrepreneurship discipline (which is part of social science), and it adopts an interpretative and hermeneutic philosophical position, because the variations in the founders' experiences is considered to be knowledge. While an inductive approach was useful in the literature review phase, an abductive approach was useful later when theory and data needed to be consulted simultaneously to better understand the process being studied (see Figure 4-1).

This interpretative research needs qualitative, rich data to convey the details of the venture creation process in a digital context. The research methods for primary data collection were qualitative, semi-structured face-to-face and online interviews and observation field notes. A purposeful and opportunistic sampling method was needed to find informants who could give rich data in the interviews. For triangulation purposes, data was collected from internet sources. The retrospective qualitative inquiry done by semi-structured interviews was chosen as suitable research method for collecting data, in order to document the journey and the events of the start-up venture creation process. Observation field notes were written within the interview context, and internet sources were collected throughout the research process.

For the data analysis, the thematic analysis method was chosen, which aligns with the interpretive, qualitative, and semi-structured interview research strategy. The coding of qualitative semi-structured interview data and the analysis of the coded data was done with the help of qualitative data analysis software (NVivo).

Table 4-9 The aim and research methodology of this research

		Chosen methods	Supporting authors
Aim and methodological positions	Aim of research	Explore and describe venture creation process of innovative start-up, in digital technology context, which is non-linear, unpredictable, dynamic and highly competitive	
	Research philosophy and methodology	Social sciences: entrepreneurship,	(Polkinghorne, 1983; Bygrave and Hofer, 1991)
		Epistemology and ontology: Interpretivism, performativity, social constructivist, entrepreneurship viewed as a process and as a journey	(Fletcher, 2006; Leitch, Hill and Harrison, 2010; Schwartz-Shea and Yanow, 2013; Packard, 2017; Dimov, 2018a; Garud, Gehman and Giuliani, 2018)
	Research approach	Abductive reasoning	(Mantere and Ketokivi, 2013; Schwartz-Shea and Yanow, 2013; Saunders, Lewis and Thornhill, 2016)
Research methods	Research methods	Multi-method qualitative	(Bygrave, Churchill and Bygrave, 1989; Bygrave and Hofer, 1991; Hlady-Rispal <i>et al.</i> , 2014; Suddaby, Bruton and Si, 2015; Saunders, Lewis and Thornhill, 2016)
	Research strategy	Qualitative inquiry, field notes, internet resources	(Ott, Eisenhardt and Bingham, 2017; King, 2018)
	Time horizon	single research episode (longitudinal), retrospective, present and future	(De Vaus, 2006; Ritchie and Lewis, 2011, p. 53)
	Research techniques and procedures	Data collection of primary data with purposeful and opportunistic sampling: 1) semi-structured interviews face-to-face and online, 2) observation field notes, and 3) data collection of internet resources	(Ritchie and Lewis, 2011; James and Busher, 2012; Galletta, 2013; King, 2018)
		Data analysis: interview data analysis, coding of qualitative data, thematic analysis using software in qualitative analysis (NVivo)	(McLellan, MacQueen and Neidig, 2003; Braun and Clarke, 2006, 2012; Guest, MacQueen and Namey, 2011; Miles, Huberman and Saldaña, 2014; Silver and Woolf, 2017; Terry <i>et al.</i> , 2017; King, 2018)
	Validity	Assessing validity, adequacy, or truthfulness in interpretative, qualitative research Triangulation Methods: triangulation via qualitative data gathered from internet sources, and audit trail Observation field notes	(Creswell and Miller, 2000; Altheide and Johnson, 2011; King, 2018), triangulation (Mathison, 1988; Patton, 2002, p. 559)
	Ethics	Ethics in qualitative research	(Ritchie and Lewis, 2011, pp. 66–67)

Figure 4-1 presents an illustration of empirical research methodology for the purpose of illustrating the whole process of the research.

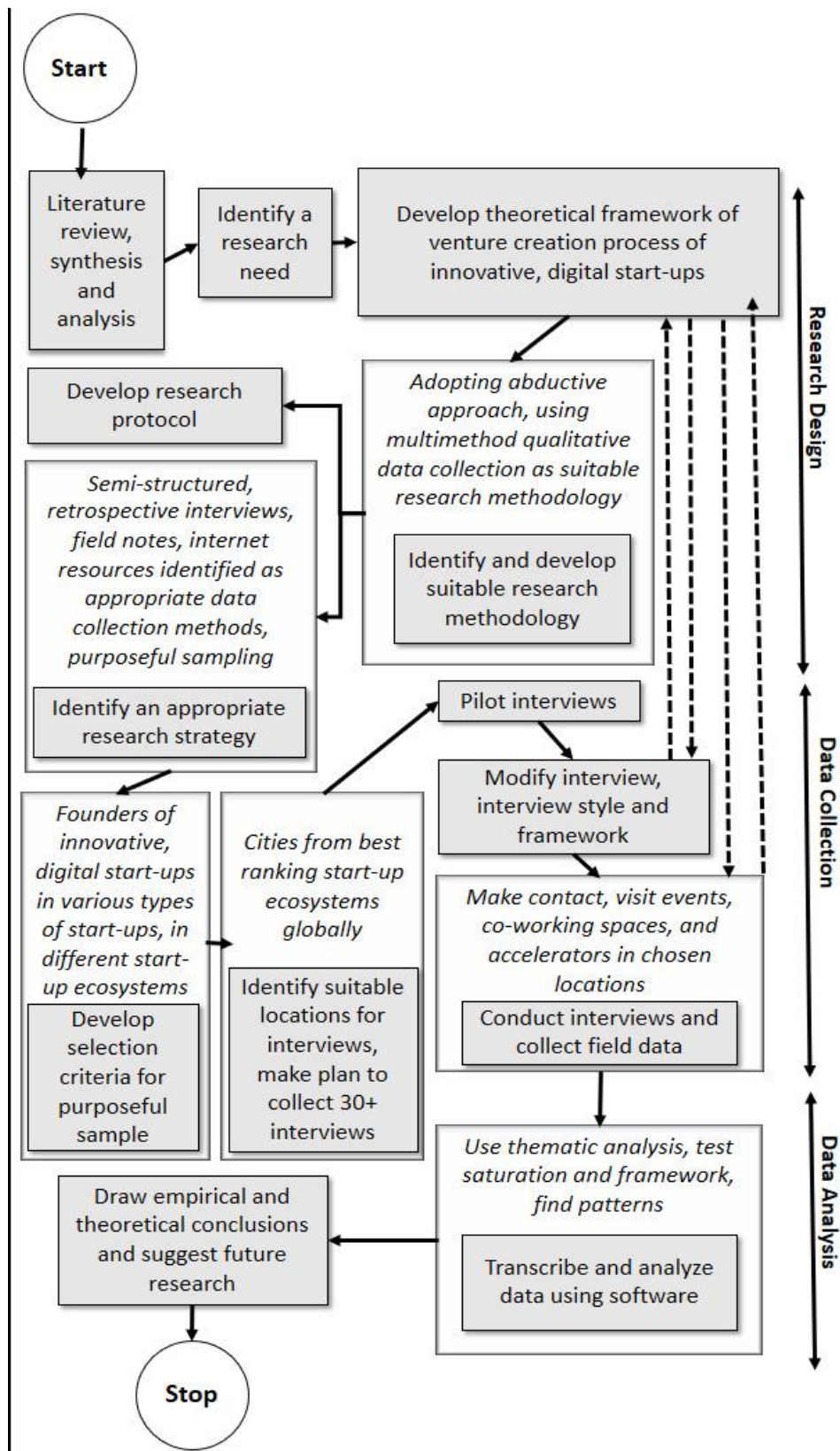


Figure 4-1 The research design of the empirical research methodology

In order to confirm that all required topics were covered (Hofer and Bygrave, 1992, p. 92) by this research, Table 4-10 was created.

Table 4-10 Topics covered by good research (Hofer and Bygrave, 1992, p. 90), adapted

	Topics covered	
Theory building steps	The Issue or Problem to be Studied	Number, meaning, and entrepreneurial opportunities are growing for digital start-ups, how the process of realizing there is an opportunity for creating a venture as a business is conducted, the issue of modelling the venture creation process of digital entrepreneurship (Chapter 1)
	The Rationale for the Research	Interpretivism, performativity, social constructivist philosophical position (Chapter 4)
	The Research Objectives & Questions	Aim: trying to explore and describe the model of entrepreneurial venture creation process of innovative, digital start-up, and then trying to find possible patterns Research questions: <i>How do innovative digital start-ups conduct the venture creation process with enabling digital platforms?</i> The sub-questions (SQ) are as follows: <ol style="list-style-type: none"> 1. How does the digital context affect the entrepreneurial venture creation process? 2. What is the role of platforms in the venture creation process of innovative digital start-ups? 3. What is the nature of and what factors affect the venture creation process of innovative digital start-ups? (Chapter 1)
	The Literature Survey Steps	Looking at existing venture creation models, studying digital context with characteristics and components, studying digital innovation models (Chapter 2), looking at new models of digital venture creation (Chapter 3)
	Model Construction	Theoretical framework constructed of following literature reviews: models of existing entrepreneurial process models, existing new models of digital entrepreneurship, venture creation process of digital entrepreneurship, and digital innovation process (Chapters 2 & 3)
Theory testing steps	The Research Design	Multimethod qualitative (Chapter 4)
	Validity issues of data	Triangulation, several
	Data-Gathering Methods	Primary empirical data collection methods: 1) qualitative, semi-structured interviews, 2) observation field notes, and 3) data collection from internet resources
	Data Analysis Techniques	Thematic analysis (Chapter 4)
	Findings & Conclusions	Chapter 5 and Chapter 6
	Implications for Future Research	Chapter 7
	Implications for Practice	Chapter 7

4.6 Data collection process

The data collection process starts with the selection criteria for the primary, empirical data as discussed in Section 4.6.1. The primary data collection, the details of the conducted qualitative interviews, and the selection criteria are explained (Section 4.6.2), as well as the collection of written observation field notes (Section 4.6.3). Section 4.6.4 describes the interview guide and database of the primary data collection. Section 4.6.5 discusses internet data collection techniques.

4.6.1 Primary data collection and selection criteria

Qualitative data of the empirical part of this research are collected from multiple sources: 1) the qualitative inquiry conducted via retrospective, semi-structured interviews; 2) writing observation field notes about the interview situations; and 3) various internet sources related to the interviewed ventures. For the gathering of primary data, the sample strategy was purposeful and opportunistic sampling. The sample was hand-picked using the four criteria in Table 4-11.

Table 4-11 Sampling criteria

	Criteria	Definitions	References
COMPANY	Company type	Start-up company	(Spiegel <i>et al.</i> , 2016, p. 425),
	Digital start-up	digital start-up as a venture where digital artefacts, digital platforms or both are the core of the new market offers and venture ideas	
	Innovative start-up	<p>1) had to develop products or services that are based on the newest technologies, or they could be developing a new, disruptive technology by themselves</p> <p>2) venture should involve at least one of the following criteria:</p> <ul style="list-style-type: none"> - new method; - new product; - new process; - new technology; - new idea; or - new business model. <p>Venture should NOT be any of the following:</p> <ul style="list-style-type: none"> - innovative follower; - passive replicator; or - example of defensive and necessity entrepreneurship 	<p>1) (Clarysse and Bruneel, 2007)</p> <p>2) (Colombelli, Krafft and Vivarelli, 2016)</p>

	Criteria	Definitions	References
PERSON	Person to be interviewed	<i>the founder, co-founder</i> or someone with the initial idea of the company, and the fundamental knowledge of the opportunity identification and the initial/basic idea of the opportunity	
	English language proficiency	had to be able to conduct the interview in English	
CONTEXT	Type of industry	FinTech, AdTech, TravelTech, EduTech, HRTech, CareTech, MediaTech	
	Type of customers	B2B, B2C	
	Geographical location	most important start-up ecosystems	(Genome, 2017; StartupBlink, 2017; VentureBeat, 2017; Genome and Crunchbase, 2018)

The geographical location as a context was taken into the research in the sample strategy, because the context is important in entrepreneurial process research, ‘entrepreneurial process cannot be abstracted from its contextual setting’ (Moroz and Hindle, 2012).

Geographical locations of start-up ecosystems around the world were chosen, as start-up ecosystems have gained a great deal of interest, their number is growing, and cities and countries are investing heavily in developing these ecosystems (Deloitte, 2019). These start-up ecosystems are ranked by different organisations based on the system of ranking performance, funding, market research, talent, and start-up experience. Table 4-12 presents the rankings from 2015 to 2018.

Table 4-12 Start-up ecosystem rankings (global)

Ran king	Compass (later Genome) Global Startup Ecosystem Ranking 2015 (Startup Genome, 2015)	Global start-up eco- system report 2017 (Genome, 2017)	Venture Beat Ranking 2017 (VentureBeat, 2017)	Start-up Blink Startup Ecosystem Ranking 2017 (StartupBlink, 2017)
1	Silicon Valley, US	Silicon Valley, US	Silicon Valley, US	San Francisco/Sili- con Valley, US
2	New York City, US	New York City, US	Beijing, China	New York City, US
3	Los Angeles, US	↑ London, UK	Tel Aviv, Israel	London, UK
4	Boston, US	Beijing, China	Stockholm, Swe- den	Los Angeles, US
5	Tel Aviv, Israel	↓ Boston, US	Los Angeles, US	Berlin, Germany, EU

Ran king	Compass (later Genome) Global Startup Ecosys- tem Ranking 2015 (Startup Genome, 2015)	Global start-up eco- system report 2017 (Genome, 2017)	Venture Beat Ranking 2017 (VentureBeat, 2017)	Start-up Blink Startup Ecosystem Ranking 2017 (StartupBlink, 2017)
6	London, UK	↓ Tel Aviv, Israel	New York City, US	Boston, US
7	Chicago, US	↑ Berlin, Germany, EU	Shanghai, China	Tel Aviv-Yafo, Is- rael
8	Seattle, US	Shanghai, China	Seoul, Korea	Chicago, US
9	Berlin, Germany, EU	↓ Los Angeles, US	Boston, US	Seattle, US
10	Singapore	↓ Seattle, US	London, UK	Paris, France
11	Paris, France	Paris, France		
12	Sao Paulo, Brazil	↓ Singapore		
13	Moscow, Russia	↑ Austin, US		
14	Austin, US	Stockholm, Sweden		
15	Bangalore, India	↑ Vancouver, Can- ada		
16	Sydney, Australia	↑ Toronto, Canada		
17	Toronto, Canada	↓ Sydney, Australia		
18	Vancouver, Can- ada	↓ Chicago, US		
19	Amsterdam, the Netherlands	Amsterdam, the Netherlands		
20	Montreal, Can- ada	↓ Bangalore, India		

Note: ↓↑ arrows mark the comparison of the ranking to the earlier report from 2015.

The latest start-up rankings rate start-up ecosystems by industry (e.g., AI, HealthTech, FinTech), instead of giving a general ranking (Genome and Crunchbase, 2018). The interview locations were selected from the ranking tables and the latest Genome Deep Dives report (Genome and Crunchbase, 2018). They were limited to a maximum of two locations per country in order to obtain greater variation.

A strategy used to find start-up founders for interviews was to participate in various start-up events, including Slush Helsinki (November 2016, 2017); New York Tech Week (October 2017); Stockholm Tech Meetup (May 2018); Startup Grind Global Conference Silicon Valley (February 2018); Women Meetup San Francisco (February 2018); Amazon Web Services AWS Pop Up Loft meetup in San Francisco (February 2018); Berlin Startup Safari (April 2018); Arctic 15 Helsinki (May 2018); and DLD Innovation Festival Tel Aviv (September 2018). Additionally, the researcher visited start-up incubators, co-working sites, and

accelerators, where she met founders and solicited interviews. Lastly, various Finnish export organisations (e.g., Business Finland, Nordic Innovation House) were helpful when arranging visits.

4.6.2 Conducted interviews, sample, timeframe, and locations

This research took as a guideline of 30+ sample size to be able to start planning the empirical part of the research (see Table 4-5). For primary data collection, the qualitative inquiry was collected via face-to-face interviews of 36 start-ups. Two interviews of start-ups located in Helsinki were left out because they did not have a start-up ecosystem involvement, total sample being 34 start-ups. The 37 interviewees were CEOs, founders, or co-founders of digital start-ups. The interviews were one-on-one, except for two interviews, one with two people, and the other with three people. During the search for the interviews two start-up founders declined to take part in the research for unknown reasons and.

The pilot question round took place from November 2016 to February 2017. The potential start-up founders were searched at Slush conference 2016 in Helsinki, Finland. Seven pilot interviews were conducted based on a semi-structured question sheet.

1. Timeframe

The start-up entrepreneur interviews, including the pilot, occurred from October 2016 to November 2018. The interviews lasted an average of 43 minutes, the shortest being 16 minutes and the longest an hour and 12 minutes. Thirty-two interviews were conducted face-to-face and three via video conference tools (i.e., Skype, WeChat, and Google Meet). The face-to-face interviews were conducted in the following locations: six in the start-up office, 13 on the incubator premises, seven in a café, and six at a start-up event. In general, start-ups founders' time is scarce; thus, many of the targeted start-ups did not have time for the interview, and much effort was needed to coordinate the 35 interviews.

2. Geographical locations

The interviews were conducted in Helsinki, Stockholm, London, Berlin, San Francisco Bay area, Tel Aviv, Beijing, Shanghai, and Hong Kong (see Table 4-13). 17 start-ups in Europe and the Middle East, 10 in Asia Pacific, and 7 in North America.

Table 4-13 Geographical locations of the interviewed start-ups

	Country	City	Target number of interviews		Conducted interviews	
Europe & Middle East	Finland	Helsinki	3		4	
	Sweden	Stockholm	2		2	
	Great Britain	London	3		3	
	Germany	Berlin	3		3	
	France	Paris	2		1	
	Ireland	Dublin	1		1	
	Israel	Tel Aviv-Yafo	3	17	3	17
Asia Pacific	China	Shanghai	3		2	
		Beijing	3		3	
	Hong Kong	Hong Kong	2		3	
	Singapore		1		1	
	India	Bangalore/Bengaluru	2	11	1	10
North America	USA	Bay Area, Silicon Valley	7		7	
		New York City	3	10	0	7
	Total		38	38	34	34

3. Interview locations

Appendix 6 lists the specific interview locations. Three interviews were conducted via video call, and the rest of the interviews were face-to-face. The observation field notes describe the interviews conducted on the company premises, accelerator premises, or in co-working spaces.

All participating start-ups had some type of involvement in the start-up ecosystem where they were located. This involvement included participating in the events of the ecosystem, being located in an accelerator or co-working space in the ecosystem, participating in their training/coaching programs, and using the networking possibilities of the ecosystem (e.g., for funding-related purposes).

4. Interviewed start-ups

This section presents the data of the participating start-ups. First, it outlines the summary of the collected data (Table 4-14), followed by basic company data (Table 4-15).

Table 4-14 Summary of interviewed start-ups

Attribute	Number of start-ups (total sample 34 start-ups)
AI Involvement	9
Blockchain involvement	5
Launched/not launched	24/10
Company registered/not registered	31/3
Owns physical assets yes/no	32/2
Is a platform/platform involvement	16
Cloud based (private or public)	27
Size of team	1 – 40
Company age	not registered – 9 years
Exits	1
Turnover (EUR)	0 – 17,7 MEUR
Earlier business ownerships	0 - 12
Still active (by March 2019)	31
Males interviewed*	30 (of 39)
Females interviewed	9 (of 39)

* In two interviews, two to three founders participated in the interview

Table 4-15 Data of interviewed start-ups the location, team size, company registration date, venture launch status, company age, turnover, and industry.

Table 4-15 Data of interviewed start-ups

Start-up ID	Location	Team size*	Gender of interviewed	Comp. reg.*	Launched yes time/no	Years active*	Turnover*	Currency	Line of industry
#01	Helsinki, Finland	3	M	yes	2013	3	N/A		Innovation?
#02	Stockholm, Sweden	32	M	yes	2013	3	2 000 000,00	EUR	FinTech
#03	London, UK	30	M	yes	2015	1	N/A		FinTech
#04	London, UK	40	M	yes	2013	3	750 000,00	GBP	Customer engagement
#05	Helsinki, Finland	3	F	yes	2016	1	0,00		EduTech
#06	San Francisco, US	1	F	yes	2010	8	N/A		Digital marketing
#07	Sunnyvale, CA, US	4	F	yes	no		0,00		Retail
#08	Oakland, CA, US	3	2xM	yes	no		0,00		Software
#09	San Francisco, US	7	M	yes	2016	2	20 000 000,00**	USD	Digital marketing
#10	Fremont, CA, US	4	3xM	yes	2018	0,1	0,00		Logistics & SCM
#11	Oakland, CA, US	7	F	yes	no		0,00		Social media
#12	Fremont, CA, US	3	3XM	no	no		0,00		Computer graphics
#13	Helsinki, Finland	3	M	yes	yes		N/A		Employee engagement

Start-up ID	Location	Team size*	Gender of interviewed	Comp. reg.*	Launched yes time/no	Years active*	Turnover*	Currency	Line of industry
#14	Stockholm, Sweden	3	M	yes	yes		N/A		Fintech
#15	Berlin, Germany	3	M	yes	no		0,00		User feedback
#16	Berlin, Germany	2	M	yes	2017	1	N/A		Food, beverage
#17	Berlin, Germany	14	M	yes	2016	2	30 000,00		HR tech, employment
#18	Bangalore, India	15	M	yes	2018	0,5	N/A		Logistics & SCM
#19	London, UK	5	M	yes	no		0,00		SoMe, videos
#20	Tel Aviv, Israel	5	M	no	2018	2	N/A		Web security
#21	Tel Aviv, Israel	2	M	yes	yes		N/A		Digital marketing
#22	Tel Aviv, Israel	8	M	yes	2018	0,5	N/A		NGO for elderly
#23	Helsinki, Finland	20	M	yes	2009	9	500 000,00	EUR	Transportation
#24	Hong Kong/ Helsinki	20	M	yes	2016	2	100 000,00	USD	FinTech
#25	Beijing/ China Rwanda (Africa)	1	M	no	no		0,00		Early stages not applicable
#26	Beijing, China	10	F	yes	2016	2	N/A		EduTech
#27	Beijing, China	7	M	yes	2018	0,5	10 000,00	RMB	Language translations
#28	Hong Kong/ Beijing, China	4	F	yes	2018	0,2	N/A		Consulting
#29	Shanghai, China	5	M	yes	2017	1	N/A		Retail
#30	Singapore/ Shanghai, China	7	F	yes	2016	0,7	N/A		EduTech
#31	Shanghai, China	35	F	yes	yes		N/A		Advertising
#32	Hong Kong	10	F	yes	2018	0,2	0,00		FinTech
#33	Dublin, Ireland/ Paris, France	2	M	yes	yes		N/A		Language translations
#34	Paris, France/ Tel Aviv, Israel	2	M	yes	yes		N/A		Advertising

* at the time of the interview

** not able to fact check

The restricted access of Chinese internet was a problem, when gathering data of internet sources of the China based interviewed start-ups. Two of the start-ups located in China had no accessible internet sources data available (in English) at all.

With regard to conducting the interviews in China, the fourth criteria of purposeful sampling (see Section 4.6.1), that the *start-up founders had to be able to conduct the interview in English*, proved vital. The three interviews conducted in Shanghai were supported

by another person who could speak English. This person corrected or clarified things that were unclear or were typical to China and needed further explanation.

4.6.3 Primary data collection and observation field notes

Two types of notes were collected during the interviews: interview notes and field (or observation) notes. Interview notes were handwritten during the interviews in order to help the interviewer recall what had been said and subsequently transcribe the interviews, as well as to check facts which arose during the interview.

Field notes which gathered on-site information were written afterwards, including:

- Face-to-face interview location (or online interview technology and location)
- Who chose the interview location and how the interview was set up
- Quality of interview location in terms of being a free place to talk (noisy, interruptions, etc.)
- Interviewee behaviour (relaxed, not relaxed)
- Start-up's stage in the venture creation process
- Other factors that could have an effect on the quality of the data

Field notes were transcribed into Word documents. Table 4-16 presents the numerical field note data. Field notes were entered into NVivo and used for triangulation.

Table 4-16 Observation field notes, gathered data

	Number	Details
Pages of field notes data	34	Microsoft Word documents
Number of interviews (start-ups) included in study	34	
Number of locations of field notes	31	3 interviews conducted via video conference

4.6.4 Interview guide and database

Interviews were based on a semi-structured questionnaire, and the questionnaire was tested during a pilot interview round. This pilot interview round resulted in changes in the questionnaire. The final version of interview guide is in Appendix 3 Interview protocol, questions sheet A and B.

The interview guide includes two sections: background (Question sheet A), and the interview guide (Question sheet B). The former requests background information regarding the start-up and founder and asks about the degree of innovation using a visual aid. The interview guide was modified several times during the research process. After the research was redirected toward the digital context, the interview guide was added with more detailed questions about digital infrastructure, platforms, and users (Questions 6, 7 and 8).

During the interviews, the order of the questions changed rapidly, and participants discussed several areas of the questions simultaneously. In addition, some questions were irrelevant (e.g., Question 11) for young start-ups, and sometimes the question about the uniqueness of the idea (Question 4) was answered in Question 1.

A database of the interview participants was created to organise the participants' contact information, the interview data (e.g., location, detailed transcription data), and also in the interview planning phase. The database with the start-up interview details remained solely in the care of the researcher. The database is kept in Microsoft Excel format and includes the following information:

- Name of the start-up
- Founder's first and last name
- Background (e.g., education of the founder, incubator)
- Website address
- Country and city, interview location
- Interview data
- Email address
- Type of interview (face-to-face or video conference)
- Phone number
- Consent forms received
- Interview transcribed
- Interview transcription code

In addition to this data, the database included the data of location, calculations of interview data (duration, transcription data), the interview schedule (when scheduled).

4.6.5 Data collection, internet sources

Another type of data was collected from various internet sources. The data collection via internet sources related to the interviewed start-ups included the following sources (Table 4-17). The data was collected in Word documents with links to the original sources. It was important to gather the material on the web because the companies' websites changed rapidly in the early stages of the venture creation. The data collected from internet sources is confidential and remains solely with the researcher.

Table 4-17 Data gathering from internet sources

Start-up ID	Company & personal web-pages	Blocked in China					Web articles	WeChat	Notifications
		LinkedIn (person & company)	YouTube videos	Twitter	Instagram	Facebook			
01-HEL	X						X		
02-STO	X						X		
03-LON	X						X		
04-LON	X	X	X	X		X	X		
05-HEL	X	X		X	X	X	X		
06-SFO	X	X	X	X			X		
07-SFO	X					X			
08-SFO	X	X	X				X		
09-SFO	X	X		X			X		
10-SFO	X	X							
11-SFO	X	X		X			X		
12-SFO		X					X		
13-HEL	X	X	X	X		X	X		
14-STO	X	X	X	X					
15-BER	X								
16-BER	X		X	X		X			
17-BER	X	X	X	X	X	X	X		
18-BLR	X	X							
19-LON	X								
20-TLV	X	X	X	X					
21-TLV	X			X		X	X		
22-TLV	X						X		
23-HEL	X			X		X	X		
24-HKG	X	X	X	X		X	X		
25-PEK									No internet sources (early stages and China based)
26-PEK							x		China based
27-PEK	X	X						X	China based
28-PEK/HKG	X								
29-SHA	X								China based
30-SNG	X	X					X		China based
31-SHA	X							X	China based

Start-up ID	Company & personal web-pages	Blocked in China					Web articles	WeChat	Notifications
		LinkedIn (person & company)	YouTube videos	Twitter	Instagram	Facebook			
32-HKG	X	X					X		
33-DUB	X			X			X		
34-PAR	X	X		X	X	X	X		

4.7 Data analysis

Data analysis consists of three types of data: semi-structured interview data, observation field note data, and internet source data. Thematic analysis was used for the interview and observation field note data. The internet source data serves triangulation and data checking purposes. The data analysis follows the audit trail and valid thematic analysis procedures discussed in Section 4.4.3. It was conducted using NVivo 12 qualitative research software, as well as levels of 3, 4 and 5 of the five-level qualitative data analysis (QDA) method (Silver and Woolf, 2017). The phases were 1) transcription of the recorded interviews, 2) coding of the transcribed interviews, and 3) displaying of the data, methods of exploring the data, and methods of explaining the data.

4.7.1 Data processing and preparation

Data processing and preparation started with transcription of the recorded interviews, collection of internet source data, and writing the observation field notes. Subsequently, the documents were entered into NVivo.

1. Transcription of interviews

The transcription of the interviews was time-consuming, because the quality of the interviews was variable due to accents, background noise, conversations where multiple people were talking, and the technology used (i.e., iPhone 6S Voice Memos). Anonymity was a concern, and recognisable features were removed from all interview material. Table 4-18 displays the transcription data.

Table 4-18 Interview transcription data statistics

	Numbers	Details
Pages of transcript data	244	MS Word documents, using <i>NVivo Question-style Headings</i>

	Numbers	Details
Word count	113,390	Transcription done in intelligent verbatim style
Interview length Total minutes	1,340 minutes	Shortest interview 16 minutes, longest 1 hour 12 minutes, average length 39.4 minutes
Number of interviews (start-ups) included in study	34	2 conducted interviews were left out because there would have been too many in Helsinki
Number of people in- terviewed	38	32 interviews with 1 person, 1 interview with 2 persons, and 1 interview with 3 persons Signed consent forms gathered from every person interviewed

Data preparation and transcription is important because inappropriate or inadequate preparation may negatively affect the quality of data analysis (McLellan, MacQueen and Neidig, 2003). The verbatim transcription style refers to faithful reproduction of the aural record (Poland, 1995). In the intelligent verbatim transcription style, the transcription is done accurately, but in order to improve the readability of the transcript, filler words (e.g., you know, like), repeated words, and false sentence starts are omitted (*Transcription Styles*, 2018). The intelligent verbatim style was adopted.

All the transcriptions of the interviews were coded in the following way (Silver and Woolf, 2017):

- Interviewee code (header 1)
- Question (header 2)
- Interviewer asking a question (header 3)
- Interview code as an answer (header 3)
- Interview (normal).

Automated transcription software (NVivo and HappyScribe) was used for transcriptions. The researcher transcribed the pilot interviews completely (7); NVivo transcription tool was used for five transcriptions and HappyScribe for the remaining 22 interviews. HappyScribe enabled the synchronisation of audio and text with an interactive interface (Scribe, 2019), meaning that the audio corresponded to the modified text.

2. Data in NVivo12

Each interviewed start-up was *one case* in NVivo12, and the case attributes were coded using case classifications (Figure 4-2 and Figure 4-3).

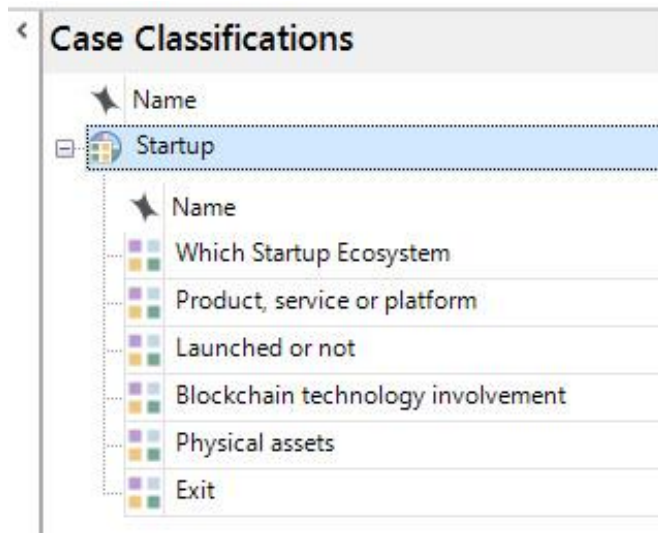


Figure 4-2 First case classifications

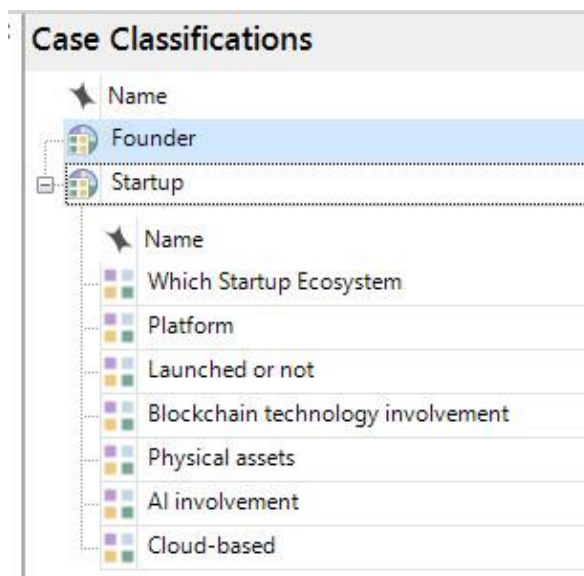


Figure 4-3 Second case classifications

The first case classification attributes product, service or platform (Figure 4-2) categorization were not used, because it was difficult to categorise the start-ups by product or service. The classification attributes were changed to include only platform, and added with AI involvement, and cloud-based (Figure 4-3).

The three collected data files were interviews, internet sources, and observation field notes. The interview transcription documents were named in the following way, as illustrated in Figure 4-4.

The three data analysis codes nodes files were auto coded interviews, auto coded observation field notes, and thematic codes (see Figure 4-4).

Quick Access

- Files
- Memos
- Nodes

Data

- Files
 - Internet sources WWW
 - Interview transcriptions INV**
 - Observation field notes OBS
- File Classifications
- Externals

Codes

- Nodes
 - Autocoded interviews
 - Autocoded observation field notes
 - Thematic codes (interviews)
- Sentiment
- Relationships
- Relationship Types

Cases

Notes

Search

Maps

Output

Interview transcriptions INV

Name
01-INV-HEL-20161107x
02-INV-STO-20161115
03-INV-LON-20161130x
04-INV-LON-20161209x
05-INV-HEL-20170125x
06-INV-SFO-20180220
07-INV-SFO-20180220
08-INV-SFO-20180221
09-INV-SFO-20180222
10-INV-SFO-20180223
11-INV-SFO-20180223
12-INV-SFO-20180223
13-INV-HEL-20180313x
14-INV-STO-20180410
15-INV-BER-20180510
16-INV-BER-20180511x
17-INV-BER-20180511
18-INV-BLR-20180531
19-INV-LON-20180531
20-INV-TLV-20180906
21-INV-TLV-20180906
22-INV-TLV-20180906
23-INV-HEL-20180910
24-INV-HKG-20181011
25-INV-PEK-20181025
26-INV-PEK-20181026
27-INV-PEK-20181026
28-INV-PEK-20181026
29-INV-SHA-20181030
30-INV-SNG-20181030
31-INV-SHA-20181102
32-INV-HKG-20181105
33-INV-DUB-20181122
34-INV-PAR-20190305

Figure 4-4 NVivo snapshot of collected qualitative data and interview transcriptions

3. Internet sources used for data analysis and triangulation

The data collected from internet sources in Word documents were uploaded into a separate NVivo file. The internet source data were used in the following ways:

- Fact-checking (company websites, Google search for the company name, YouTube)
- Collecting data on founder's career (LinkedIn)
- Investigating how the venture had developed since the interview took place (company website, Twitter profile, and Facebook page)
- Gathering additional data on the venture creation (YouTube)

4. Observation field notes data analysis

Observation field notes were written in Word documents and submitted to NVivo in a separate file for the needs of auto coding. Observation field notes were written in Word documents and submitted to NVivo in a separate file for auto coding. The observation field note structure:

1. Place of the face-to-face interview, (or online interview technology, and places)
2. Who chose the interview location, and how the interview was set up
3. Interview location in terms of free place to talk (noisy, interruptions etc.)
4. How did the interviewer behave (relaxed, not relaxed)
5. What stage of venture creation process of the start-up is
6. Other factors that could have an effect the quality of the data
7. Other interesting factors

The auto-coded observation field nodes were used for data quality analysis.

4.7.2 Overview of data collection and analysis

The data from interviews and observation field notes was gathered over a period of 2.5 years (pilot and main interview round). The internet data gathering was used for fact checking during the transcription and analysis stage, followed up on how the interviewed start-ups were progressing after the interview, and whether the start-up was still active or had discontinued their venture.

Data collected from the internet sources are difficult to measure. The number of pages of Word documents is not a proper metric because following the start-up venture creation process typically involves checking their website to assess whether they have changed their business model and process outcome (Table 4-19).

Table 4-20 documents the process of data collection and analysis. Secondary data gathering from internet sources was conducted throughout the data collection and analysis.

Table 4-19 Summary of collected data

	Numbers	Details
Sample of innovative digital start-ups	34	
Persons interviewed	38	
Pages of field notes data	34	MS Word documents
Interview data: Pages of transcript data	244	MS Word documents
Data gathered from internet sources	5-13 PDF files per start-up	Saved webpages (PDFs), gathered YouTube and Twitter links in MS Word documents

For the follow up (see Table 4-20, Stage 4), the interviewed start-ups were checked via internet sources to determine which ones were still active. Of the interviewed 34 start-ups, 23 were found to have survived (see Table 5-15). The interview data of still active start-ups was analysed with a third cycle of coding using DIGITAL presuffix in the codebook (see Appendix 7).

Table 4-20 Overview of the data collection and analysis

	Stage 1: Preparation	Stage 2: Field visits	Stage 3: Data analysis	Stage 4: Follow up
DATA COLLECTION	Conducted pilot interviews (7)	Conducted 27 interviews		
	Secondary data collected from pilot interviewed start-ups (internet sources)	Secondary data collected from internet sources of interviewed start-ups	Checking the interview transcriptions via secondary data when analysing the data	Checking via internet sources, which interviewed start-ups are still active and their current process outcome
	Gathered data from observation field notes of pilot interview round start-ups (7)	Gathered data from observation field notes of main interview round start-ups (27)		
DATA ANALYSIS	Pilot interviews (7) manually transcribed	Main interviews (27) transcribed with the help of transcription software	Conducting data analysis using thematic analysis method with the help of qualitative data analysis software	
			First and second cycle of coding of all interview data (34)	Third cycle of coding of interview data from still active start-ups (21), coding with DIGITAL themes
	Nov 2016 – Feb 2017	Feb 2018 – Mar 2019	Feb 2019 – June 2019	May 2020 – Sep 2020

4.7.3 First-cycle codes and coding of interview data

This section describes the coding of the qualitative interview data, including the first cycle of coding, coding tree, and audit trail. The thematic analysis of the transcribed data was downloaded to NVivo12, and initially coded with automated coding.

1. *First cycle of coding*

From the seven types of first cycle coding methods (Saldaña, 2015), the holistic, descriptive, and theming of the data were used. The qualitative data needed to first be examined from the holistic point of view due to the amount of data. For further coding, the descriptive method is used; the theming of the data is also used to enable more detailed coding.

After the interviews were transcribed and transferred to NVivo, the data coding started with first-cycle coding, where codes are deducted from the framework (literature review), and a coding scheme (organising coding with nodes in trees in NVivo) is created (Bazeley and Jackson, 2013, p. 99).

2. *Codebook*

A structured coding scheme (i.e., codebook; Appendix 7) was created along with coding, following the notion that complex coding schemes are less reliable than simple ones. However, the researcher should remain sensitive to the nuances of the data (Campbell *et al.*, 2013). Additionally, the guidelines of the four-step model (Guest, Bunce and Johnson, 2006, p. 64) are applied with brief definitions, full definition, when to use, and when not to use.

Figure 4-5 presents the first-cycle coding tree (thematic codes) (Miles, Huberman and Saldaña, 2014).



Figure 4-5 First-cycle coding tree (thematic codes)

4.7.4 Second coding cycle, analytic memoing, and annotations

The second cycle of coding was done on the nature of the venture creation process, the technologies used, business model, and platform themes.

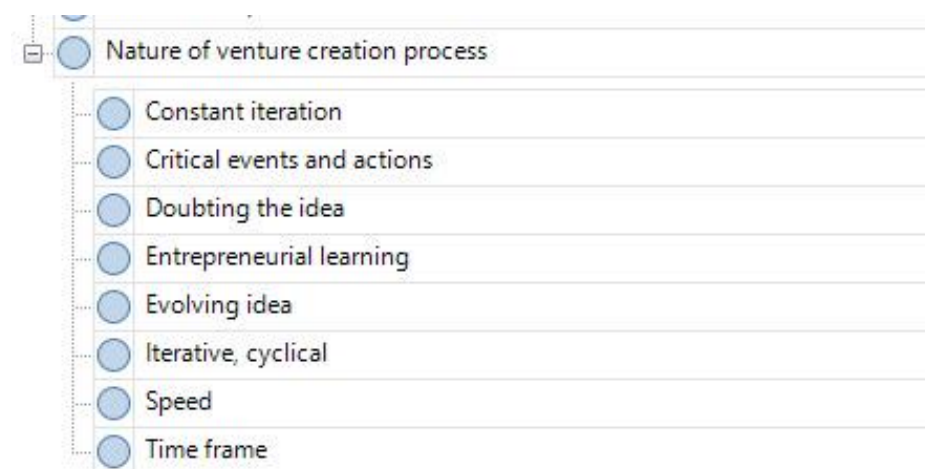


Figure 4-6 Part of second cycle coding

1. Jottings (analytic sticker notes)

So-called 'analytic sticker notes' (in digital form in NVivo) were not adopted because the audit trail included a great deal of data.

2. Audit trail

This research follows the audit trail recommendation and maintains 'a step-by-step record of how analysis has progressed from the start of the process to the final form' (King,

2018, p. 305). The audit trail document was done by writing simultaneously while coding and conducting data analysis with NVivo. The audit trail is in Appendix 5 Audit trail.

3. *Analytic memoing and annotations*

For the purposes of quality, transparency, and validity, analytic memos, ‘a brief extended narrative that documents the researchers reflections and thinking process about the data’ (Miles, Huberman and Saldaña, 2014, p. 95), are suggested for use. These memos include three types: 1) memos with reflections related to the venture, linked to sources in NVivo language (mainly done during coding); 2) memos with the findings related to framework (general findings, not related to a specific venture); and 3) memos with ideas that do not fall into the first two categories, such as new emerging findings, hunches, and reflections. The memos were written in text format in the audit trail, and not as separate memos.

4.7.5 Third cycle of coding

The third cycle of interview coding pertained only to the start-ups which were still active in May/June 2020. The surviving start-ups were found via internet search, which verified that 23 of the 34 were still active. Some start-ups could not be checked because they were in China (no web access); one was in such an early stage that was not possible to verify. Being active was taken as an evidence of survival at this point in this research. The surviving start-ups’ data was coded by creating new nodes marked with the prefix DIGITAL in the codebook. Furthermore, a 15-point checklist of good thematic analysis (Braun and Clarke, 2006, p. 96) is used for quality purposes (see Table 4-20).

The quality of the interview data was enhanced by using intelligent verbatim style transcription. In addition, the researcher’s notes taken during the interview were used during the transcription to verify and understand the technical data described. The quality of the automated transcription software was insufficient, and the researcher checked the accuracy and correctness of the transcription using a transcription tool that allowed for synchronised audio and text editing (see Section 4.9 and Table 4-21).

Table 4-21 A 15-point checklist of criteria for good thematic analysis (Braun and Clarke, 2006, p. 96)

Process	No.	Criteria	Check
Transcription	1	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'.	9 Mar 2019
Coding	2	Each data item has been given equal attention in the coding process.	4 Jun 2019
	3	Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive.	23 Oct 2020
	4	All relevant extracts for all each theme have been collated.	23 Oct 2020
	5	Themes have been checked against each other and back to the original data set.	✓
	6	Themes are internally coherent, consistent, and distinctive.	23 Oct 2020
Analysis	7	Data have been analyzed - interpreted, made sense of - rather than just paraphrased or described.	9 Sept 2019
	8	Analysis and data match each other - the extracts illustrate the analytic claims.	15 Sept 2019
	9	Analysis tells a convincing and well-organized story about the data and topic.	15 Oct 2019
	10	A good balance between analytic narrative and illustrative extracts is provided.	15 Oct 2019
Overall	11	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly.	✓
Written report	12	The assumptions about, and specific approach to, thematic analysis are clearly explicated.	✓
	13	There is a good fit between what you claim you do, and what you show you have done - i.e., described method and reported analysis are consistent.	15 Nov 2019
	14	The language and concepts used in the report are consistent with the epistemological position of the analysis.	23 Oct 2020
	15	The researcher is positioned as active in the research process; themes do not just 'emerge'.	23 Oct 2020

4.8 Ethical considerations

Ethical considerations are important in qualitative in-depth interviewing, especially because the unstructured nature may raise unanticipated issues (Ritchie and Lewis, 2011, p. 66). Another ethical validation asks whether the study in question is beneficial to the target population (Leitch, Hill and Harrison, 2010).

Ethical issues and recommendations for researchers who conduct in-depth interviews concern maintaining confidentiality and privacy, informed consent, harm, dual role and over-involvement, politics, and power (Allmark *et al.*, 2009). Other concerns are legal con-

siderations such as copyright, data management issues, conflicts of interest (e.g., funding), and institutional requirements of the researcher's institutions (Bell, Bryman and Harley, 2011).

All interviews were conducted on voluntary basis, and the consent form and participant information form were given at the beginning, pointing out that the participant is able to share or not share the information, that the interview data and results will be handled anonymously in the research, and that they are free to leave at any time, if needed. In addition, they were allowed to ask questions concerning the research.

This research has passed the ethical procedure conducted by the University of Westminster.

Table 4-22 presents the ethical issues and recommendations.

Table 4-22 Ethical issues and recommendations

Ethical issue	Recommendation	Adapted for this research	Supported by
Privacy (anonymity) and confidentiality	Using pseudonyms and initials, remove identifying details in reports, avoiding attribution of comments (indirect and direct)	Using the codes for interviews, internet sources, and observation field data, identity and start-up name carefully avoided to be mentioned or referred to	(Allmark <i>et al.</i> , 2009, p. 51; Ritchie and Lewis, 2011)
Informed consent	Providing detailed information about nature of research	Nature of interview explained when interviews organized, using Informed consent form (with signature) and participant information sheet	(Allmark <i>et al.</i> , 2009, p. 51; Ritchie and Lewis, 2011, p. 66)
Protecting participants from harm	To abandon lines of questions if participants words and gestures show need	Adapted	(Allmark <i>et al.</i> , 2009, p. 51; Ritchie and Lewis, 2011)
Protecting researcher from harm	When conducting field-work risks should be minimized	Interviews conducted in public places (company premises), no home interviews, adequate travel insurance coverage	(Ritchie and Lewis, 2011, p. 70)
Dual role and involvement	Researcher should disclose professional background	When arranging interviews by email, professional title shows, always when introducing oneself title is mentioned	(Allmark <i>et al.</i> , 2009)
Politics and power	Be grateful for interview, researcher interviewer's role is not cathartic one	Always thanking for interview, no advice given, or stating political stance	(Allmark <i>et al.</i> , 2009)

Ethical issue	Recommendation	Adapted for this research	Supported by
Legal considerations	copyright	I am unable to obtain consent for all third-party copyright material, and will submit a redacted version (noting any Sections omitted) upon completion of my degree for inclusion in Westminster Research and the British Library's e-theses Online Service (EThOS)	(Bell, Bryman and Harley, 2011, p. 147), WBS VRE
Data management issues	Long term preservation and sharing plans should be explicit	Data in the care of researcher, no other use intended	(Bell, Bryman and Harley, 2011, p. 146)
Conflicts of interest	affiliations with e.g. funding	Funding received has no conflicts of interest with this research	(Bell, Bryman and Harley, 2011, p. 149)
institutional requirements of the body of researcher's institutions	ethics approval by university	ethical application approved with no need for full ethics approval (VRE)	(Bell, Bryman and Harley, 2011, p. 154)

The participants completed and signed the following forms (see Appendix 4 Consent forms): informed consent form, participant information sheet, and background information form.

4.9 My journey of methodology

From the beginning, it was evident that the qualitative research method was most appropriate for this research's aim. The reason was that digital technology has changed every aspect of doing business in such a way that new understanding and exploration of the entrepreneurial journey needed a research method that would give rich data on how entrepreneurs act and the kinds of choices they must make while developing the entrepreneurial opportunity of a digital venture.

Conducting a longitudinal processual research was not an option, as start-up entrepreneurs are busy, and arranging multiple interviews would have been difficult, especially since the face-to-face interviews were conducted in different geographical locations and sometimes needed to be conducted during a lunch break. If the research strategy had been case study, multiple interviews with longitudinal data could have been possible, but the emphasis of this research required collecting data from founders of up to 40 start-ups

in different locations. This approach was thought to be more appropriate for the aim of this research; since entrepreneurial processes should be studied in context (Moroz and Hindle, 2012), more interviews and a greater number of different start-ups could be researched this way. Fewer cases would not have been adequate for the pattern-finding target.

Therefore, the methodology had to be changed to single interviews, collecting the narratives of start-up founders with rich data and attempting to include the context in the event sequences by asking questions about when each critical event occurred. Subsequently, the narrative research methodology was changed to semi-structured interviews. After the first pilot round, it was evident that, with 34 interviews, it would not be possible to conduct the narrative research methodology in the way needed for the area of this research. The context of digital technology needed to be included in the questions. The interviewed founders spoke for more than one and a half hours when given the chance to tell their whole story, and some vital information about the venture creation in digital context and the technological architecture was missing from the interviews.

As it became evident that context was an important factor in this study, the founders of start-ups needed be interviewed in different locations, not only in Finland. The locations were selected by identifying the best start-up ecosystems (Genome and Crunchbase, 2018) in the world and seeking founders of digital start-ups who would be willing to give an interview. An example of the meaning of context, in this case the geographical location, is the Uber taxi service. This type of taxi service has been or remains illegal in certain countries (e.g., Finland), and would need a specific location (in this case, San Francisco) to be developed as a business.

Contacts for the start-ups were generated by participating in start-up conferences, events and visits including the annual SLUSH start-up conference in Finland (November 2016, November 2017); New York Digital Future Lab NYU (October 2017); Helsinki Maria 1-0 accelerator (March 2018); Arctic Start-up in Helsinki (May 2018); Stockholm Tech Meetup (April 2018); Start-up Grind conference in Silicon Valley (February 2018); Start-up Safari

Berlin (April 2018); Tel Aviv Digital Conference (September 2018); and Beijing and Shanghai accelerators Z-InnoWay, x-lab Tsinghua University, Shanghai XNode start-up accelerator, and Hong Kong Cyberport accelerator (November 2019).

As context is of the essence in this research, it was important for the researcher to physically experience the locations of the interviewed start-ups. The start-up ecosystems are different in nature and geographic locations are relevant to this research.

Handling the vast amount of the transcribed interview data required a system. The NVivo program was useful, and to properly manage the program, it was important to complete three NVivo courses (a two-day course in December 2016 and two different one-day advanced user courses, one in May and another in December 2018).

For the data collection, companies' websites, YouTube videos and LinkedIn were used. Unfortunately, interesting material (e.g., the history of the start-up) was occasionally removed from the websites before being documented. Since start-ups are concerned with their digital image, changes happen rapidly on the web, and one should immediately save the material at hand.

In the assessment phase (Section 7.3.1), researcher bias was assessed. The researcher's initial assumption was that start-up founders are busy and do not prioritise giving interviews. Moreover, the rapidly changing ways of developing the venture idea, as well as changes in technology and team members were expected findings of the research.

For the analysis process, the adaption of the audit trail was a helpful solution for keeping track of dates and data analysis tasks conducted; it served as a place to document questions that arose during the analysis process.

The transcription phase was the most time-consuming part of the research aside from the interview trips. The researcher fully transcribed the first seven pilot interviews, after which automated transcription solutions (i.e., NVivo Transcription and HappyScribe) were used. However, the NVivo transcription was expensive and low quality, and the transcription was difficult to proofread. This led to HappyScribe being used for most of the transcriptions. HappyScribe synchronised the interview audio with the text editing tool, and this saved a great deal of time in the proofreading process.

Unfortunately, the automatic transcription quality is still poor, and the researcher needs to review and correct the whole transcription to verify its accuracy. Most likely the terminology start-up founders use is unfamiliar to the machine translation software, as the translations included a fair amount of gibberish.

For the data analysis, the use of NVivo was a valid choice. The amount of data would have been too laborious to handle without NVivo. The training courses taught how to handle the software and tools so that the main emphasis was on how to code the data.

NVivo's automatic coding tool was used, so the data analysis could start from the automated coding phase, which saved time. The code book was also a useful feature and was automatically generated by NVivo.

There were more material from the field trips, events visits, and start-up sites, which was possible to use for the needs of this research.

The researcher decided to run a third cycle of coding in May/June 2020 to determine whether anything was missed from the vast interview material. Only the 22 start-ups that were successful enough to survive and still had websites were taken into the last cycle of coding.

4.10 Conclusions of methodology

This research is an explorative and descriptive study that studies a relatively new phenomenon of digital innovative start-ups and their venture creation process. The methodological choices had to align with the research aim and provide rich data with different types of digital, innovative start-ups in a dispersed geographical area. The qualitative research method was adopted early in the study due to the need to collect detailed views, which calls for rich data; because the subject of the research was venture creation *process*, in which events occur over time; and because context is vital in this research.

The initial idea of collecting the data with narrative inquiry and analysing the data with narrative analysis methods was abandoned after the pilot interview round. The reason was that interviews were too long and did not give the data of the digital context related issues; instead, the narrative concentrated on various topics and incidents during the entrepreneurial journey, depending on the founder. That could have been another way to

conduct research on digital entrepreneurship, but this research had chosen to focus on venture creation process and digital technology context with a descriptive and explorative study and holistic modelling of the process.

The 34 semi-structured interviews conducted provided sufficient data to create the holistic venture creation model presented in Chapter 6 and to describe the nature of the process. Data from internet sources was used in many ways, including collecting additional data on the start-ups and the founders which did not come up in the interviews, verifying the interview data, and checking whether the start-up was still active. Observation field notes were collected from the interview location and to document the specific facts of each interview situation which are needed in the discussion of validation.

5 FINDINGS

The theoretical framework was created for the venture creation process of innovative digital early stage start-ups (see Section 3.2.2). Based on the framework, a multi-method qualitative research was conducted, including qualitative inquiry, field note collection, and internet research. The data gathered in the interviews were analysed thematically, and this chapter presents the findings. The thematic analysis aimed to find themes in the data with regard to the venture creation process, to use these themes to create a holistic model, to describe the nature of the process, and to find patterns in the process.

The research findings presented in this chapter include the digital venture ideas of the participating start-ups (Section 5.1); antecedents and triggers (Section 5.2); findings related to the venture creation process (Section 5.3); moderators of the venture creation process (Section 5.4); and contextual variables of the process (Section 5.5). The third section (5.3), findings related to the venture creation process, are grouped according to the process dimensions from in the literature review and used in the theoretical framework as follows: opportunity identification; *initiation* (first concrete actions taken to materialise the digital artefact); *duration* (time from venture creation process initiation to outcome), also known as opportunity evaluation, development, and exploitation; and *outcome* (sustained offering of a digital artefact). The digital innovation process phases are *discovery* (new ideas are discovered for potential development into a process, product, or BM innovation); *development* (idea for core technology is developed into usable innovation); *diffusion* (innovation spreads across a population of potential users); and *impact* (focus is on digital innovations' effects on individuals, organisations, markets, and society; see Section 3.2.2).

The findings are grouped and presented in the theoretical framework with process phases, including the three views of the venture creation process: entrepreneurship, digital innovation, and digital entrepreneurship. All three views are included in this study because they all align with the focus of this research (see Figure 1-1).

- Discovery: opportunity identification
- Development: opportunity evaluation, development and exploitation, and initiation and duration
- Outcome: emergent outcome

- Future of the venture: venture growth, scaling, diffusion and impact

The venture creation process themes start with the presentation of the data of the digital venture ideas, following opportunity identification/discovery. The development themes are presented in order of number of mentions (Table 5-5), with separate sections dedicated to technological architecture, BM search, and the role of platforms, due to their importance to this research. Findings from the data related to the future are presented last (Section 5.4.4).

Section 5.4 presents the BM moderator data, divided into macro-level, firm-level, and micro-level (Zaheer *et al.*, 2018). The nature of the venture creation process of a digital venture (Nambisan, 2017; von Briel, Recker and Davidsson, 2018) and critical events moderating the process are presented in separate sections. The last section of this chapter, on contextual variables, includes findings related to context (e.g., location and type of industry). The contextual variables are presented separately due to the importance of context in the venture creation process.

Words used to describe the venture creation process

When all transcriptions were entered, the first NVivo analysis was to run the word query to identify which words the participants used most often when discussing their venture creation process. Two analyses were used: word cloud and word count. This analysis helps provide an understanding of what the founders emphasise most. Figure 5-1 presents the word cloud analysis (by NVivo).



Figure 5-1 Word cloud generated by NVivo

The most frequently used words were idea, people, start, time, know, first, and platform.

Table 5-1 displays the 25 most common words from the transcribed interviews.

Table 5-1 Word count of 25 most frequently used words in interview transcriptions, generated by NVivo

	Word	Word count (how many times occurred in interview transcripts)
1	idea	609
2	people	486
3	start	392
4	time	359
5	know	348
6	first	317
7	platform	283
8	now	278
9	think	276
10	want	268
11	something	239
12	need	237
13	business	235
14	going	233
15	make	227
16	company, product	215 (both words)
17	service	208
18	work	199

	Word	Word count (how many times occurred in interview transcripts)
19	data	194
20	digital	193
21	things	187
22	different, money	179 (both words)
23	use	177
24	new	174
25	opportunity	169

5.1 Digital venture ideas

This section presents the findings of the digital venture ideas of interviewed start-ups in two areas: the basic idea (Appendix 8 Tables of detailed findings, Table 1) and the uniqueness of the idea (Appendix 8 Tables of detailed findings, Table 2). The categories of basic idea findings emerged from the thematic analysis: digitisation of financial section; new demand and new services; data-driven ideas; artificial intelligence (AI) based ideas; algorithm-based ideas; ideas with innovative ways of marketing and advertising; education tech; and new ecosystem based on blockchain technology.

An example of a venture idea from the FinTech industry is how new technology and a new regulatory environment enable new innovative, digital services.

‘We are part of FinTech industry. Banking as a whole is not necessarily growing but the FinTech part of it is. I think there is a huge demand for digitalization in banks and mainly driven from customers’ expectations of more transparency more “I’m in control” and I think it has been kind of monopoly system with banks for many years, so mainly technology is taking away that monopoly from the banks, which is then pushing for or is increasing competition. And competition is mostly about transparency, user experience smoothness etc. Our service is new innovative, standard financial services (FinTech), In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work.’ (STO-02)

In the retail industry, the digital customer data that smartphones provide are a source of new venture ideas

We leverage the mobile phone, the smart phone to create that data driven engagement between the retailer and the consumer. (04-LON)

Artificial intelligence has made it possible to translate spoken language and written text based on natural language programming (NLP). Other areas of AI-based ideas were content screening and optimisation services. An example of a content screening idea is as follows:

Our idea is based on artificial intelligence, we have developed some engine, that can recognize appropriate content inside of the traffic. (20-TLV)

Ideas based on algorithms included a possibility to build a so called (s.k.) recommendation engine.

We are setting up a market place, which connects the customers to food, beverages, retail, and even with digital vouchers. That you can in your convenience discover personalization, and we can bring those all together for you as a consumer. And, and for you it would be in a form of an app and then we are handling the logistics in the personnel that are actually provide that delivery to you. We have recommendation technology ... we have the recommendation engine (07-SFO)

Blockchain technology makes it possible to create a whole new ecosystem.

What we are doing is, we are creating a new version of the internet, we could say. We call it Web 3.0 (24-HKG)

Data regarding the uniqueness of the digital venture ideas is presented in Table 5-2 and detailed findings in Appendix 8 Tables of detailed findings, Table 2.

Table 5-2. Uniqueness of the digital venture (extract)

Themes	Description
User-experience based	<ul style="list-style-type: none"> – A solution people wanted to use, create trust in technology through the user experience – Easy to use blockchain solution, easy user experience – Simple, better quality, and flexible solution provided with digital technology
Real-time based	<ul style="list-style-type: none"> – A real-time system – Real-time data in FinTech industry product – A system of simple, real-time, and protected from data loss – A solution which makes verification on demand
Technology-based	<ul style="list-style-type: none"> – A solution combining technology to execute the process from the beginning to the end – A system which is not hackable, encrypted technology
Personalisation, algorithm-based	<ul style="list-style-type: none"> – A solution based on a matching algorithm and the number of verticals integrated in one platform – Rich content, building distinctive personality, feel of like human touch involved
AI-based	<ul style="list-style-type: none"> – A standardised, scalable product, AI in the backend – Verification on demand, machine (next-generation firewall) inside the content or hosting provider

5.2 Antecedents and triggers

This section presents the findings of antecedents and triggers. The antecedents presented in the theoretical framework are dynamic capabilities, prior knowledge, social networks, change in competition, and technological changes. The trigger refers to the event or reason which led the founder to start the venture creation process, and the identified triggers include changes in technology, customer need, and entrepreneurial call.

1. Previous experiences of participating start-up founders

All interviewed participants had earlier start-up experience, relevant work experience, or relevant studies prior to beginning their start-up venture creation process, see Table 5-3.

Previous experiences came from owning other businesses and working for a start-up as an employee, as well as business- or technology-related work experience, studies, and hobbies (Appendix 8 Tables of detailed findings, Table 3). Fifteen of the founders were previously business owners, and the type of businesses varied greatly (e.g., restaurant, conference, hot dog stand, online liquor store, event company, importing from China, TV and DVD manufacturing, nightclub, pub, candy factory, van hire company, web site development, and gaming).

Participants' experience working for a start-up as an employee included AI and sales. The founders' business-related experience occurred in the banking and financial sector, non-profit organisations, tourism industry, and advertising.

Education levels also varied greatly. The participants included two individuals with PhDs and one with an MBA; the participating founders studied at universities (e.g., Stanford, Berkley, Harvard, Cambridge, Wharton, and Beijing Institute of Technology), in start-up schools, and in MBA programs.

Half of the interviewed founders had either been founders before or held a position in a start-up. Of the interviewed participants, 17 (50 %) did not have previous start-up experience.

Previous experience is presented by type (Table 5-3). Relevant work experience is based on the type of venture the participant is pursuing (e.g., earlier work experience in the financial sector when the start-up is in FinTech). The table notes academic studies which were related to either digital technology or start-ups (12 persons). Two columns are for serial entrepreneurs (15 persons), whose number of earlier start-ups ranged from one to 12. Previous start-up work experience is considered to be when the participant worked for a start-up other than their own (3 persons).

Table 5-3 Previous experience, networks

Start-up ID	No earlier start-up experience	Relevant work	Studies (digital tech or)	Not first start-up	Number of earlier start-ups	Earlier start-up work	Earlier networks	Comments
01-HEL				X	3			
02-STO				X	1		X	
03-LON				X	4*	X*		*Not sure which category
04-LON	X	X					X	Work experience: FinTech
05-HEL				X	1			
06-SFO				X	2			
07-SFO	X		X				X	Studies: start-ups
08-SFO						X	X	
09-SFO				X	4		X	
10-SFO	X		X					Studies: AI
11-SFO				X	10			
12-SFO	X		X					Studies: Dig tech and start-ups
13-HEL						X	X	
14-STO	X		X				X	Studies: Dig tech
15-BER	X		X				X	
16-BER	X		X					Studies: Dig tech
17-BER				X	2			
18-BLR				X	3		X	
19-LON				X	2			
20-TLV				X	3		X	
21-TLV	X	X					X	Work experience: Advertising
22-TLV	X		X				X	Studies: Start-ups
23-HEL				X	2		X	
24-HKG				X	12		X	
25-PEK	X		X					Studies: Dig tech
26-PEK	X		X					
27-PEK	X		X					Studies: AI
28-PEK/HKG	X						X	
29-SHA				X	3		X	
30-SNG				X	1			
31-SHA	X	X					X	Work experience: Advertising
32-HKG	X	X	X				X	Work experience: FinTech, studies: start-ups
33-DUB	X		X					Studies: Start-ups & AI
34-PAR		X					X	Work experience: Advertising
Total	17 (34)		12 (34)	15 (34)	1 - 12	3	19	

2. Triggers

Table 3 in Appendix 8 Tables of detailed findings presents the detailed findings of triggers. The triggers were divided into four themes: critical event; entrepreneurial call; new segment or user group; and new technology or the price of the new technology. The triggers based on technology were the emergence of blockchain technology, the possibilities that platforms provide for human interaction, mobile apps, and quick response (QR) codes. Additionally, big data and algorithms were triggers:

I started to learn about the big data, the next big thing which were *the big data, algorithms, payments, robots*. (32-HKG)

5.3 Digital venture creation process

The digital venture creation process findings include the data from the interviewed start-ups, presented in the categorisation adopted by this research: *discovery* (opportunity identification); *development* (opportunity evaluation, development and exploitation, and initiation and duration); *outcome* (emergent outcome, sustained outcome); and *future* (diffusion and impact). Separate sections are dedicated to technological architecture (also called digital building blocks in this research), BM search, and platforms in the venture creation process. These themes are presented separately due to the importance of these subjects to this research.

Technological architecture is discussed in the digital technology context (see Section 2.3) and in the digital innovation context (Section 2.5). A business model is one of the major concepts in new venture creation models (see Section 3.1.1); platforms and their importance are discussed in several chapters (see Sections 2.3.5, 3.1.1).

5.3.1 Discovery phase

This section presents the findings of opportunity identification (see Table 5-4). The findings are put into a table to show what types of themes affected the opportunity identification of each participating start-up. The most common opportunity identification themes are from new technology and new technological solutions (10), and previous career experiences (9). The cases where three different opportunity identification themes were mentioned include references to both new technology and new technological solutions.

Opportunity identification may happen in many ways.

Several participants identified opportunity in their previous experiences, when something did not work the way it should and needed a better solution.

My last job we implemented Google Analytics and we hired analytics agency to help us out. They are supposed to be experts, they are experts, we used their developer to code all the things we wanted to track. And the entire process took about 100 hours of development throughout two months and we ended up losing data. So, this is what kind of push me towards ... (21-TLV)

I identified when I knew and when I worked in the previous job in the advertising industry, seeing that the attention and the user engagement was year after year low and lower. And then I studied this market, and I understood that the new generation doesn't watch ads anymore (#34)

An example of a technology-based opportunity identification happening with in previous career, how new technology can automate the process.

Because in my last job I saw a loop hole my industry, that is very traditional. It doesn't really ... a lot of the work that we do, we can automate it, so that is why I saw an opportunity actually from my previous work experience. (28-PEK)

New technology in the form of a mobile application solves the problem of mobility:

So suddenly the idea came up to my mind, just to do an app. And then the app becomes very mobile. With the mobility, even if I am holding my seminar a bigger hall or a hall, as long as people are bringing an app instead of that I have to stick to a terminal, then I put the software on the app then I can teach as many people at one time. (32-HKG)

Table 5-4 Opportunity identification

	TOTAL	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34
Themes																																			
New technology, new technological solution	10					X					X							X			X		X	X				X		X		X	X		
Personal mission	2																							X	X										
Previous career experiences	9	X											X								X	X	X					X	X			X		X	
Researching the market (survey, interviews, data research)	6							X	X	X		X						X	X																
Personal problem, need	6							X			X	X					X										X						X		
Seeing the gap, service/solution does not exist	5				X																									X	X	X		X	
Requests	3								X		X																						X		
Co-founder suggested/ asked to join to develop the idea	2																			X							X								
Saw what was happening in the industry	1																						X												
Total	44	1				1	1	2	2	1	2	2	1	1				1	2	1	1	2	1	3	2	1		2	2	1	2	1	3	3	2

5.3.2 Development phase

This section presents the different themes participating start-up founders spoke about or conducted during the evaluation, development, and exploitation process or with the digital entrepreneurship phases of initiation and duration. First, Table 5-5 gathers the actions and the number of mentions. Second, this section presents more detailed of findings with quotations relevant to each task.

The actions included in the development dimension come from the codebook (see Appendix 7). Originally, the actions were in the alphabetical order, which is NVivo's way of presenting the nodes. Table 5-5 displays the first- and second-order codes (Gioia, Corley and Hamilton, 2013) ranked by the number of mentions. The first-order codes are presented in this section in detail (Table 5-5), and the second-order codes are presented in separate sections. The second-order codes are BM search including pivoting, scaling, and value creation (Section 5.3.4); context-related findings (e.g., location; Section 5.5); technological architecture including digital outcomes, digital technologies, resources, and components used (Section 5.3.3); platform-related talk (Section 5.3.5); venture creation process moderators including team building, network building, and entrepreneurial learning (Section 5.4); and the nature of the process (e.g., doubting the idea, using a lean and agile way of developing; Section 5.4.4).

Table 5-6 Key

BM = Search for business model (Section 5.3.4), C = Context-related (Section 5.5.1), T = Technological architecture (Section 5.3.3), M = Moderators (Section 5.4), N = Nature of the process (Section 5.4.4), P = Platform-related (Section 5.3.5), O = Outsourced, I = Developed in-house

Table 5-5 Actions mentioned during development phase

2 nd or- der	Actions during devel- opment phase 1 st order codes	TOTAL	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34	
OUTCOME	Ecosystem	2												Early stage												X	Very early stages							X			
	Platform	16	X	X	X	X		X	X		X				X		X	X	X						X	X					X				X		X
	Mobile app	16		X		X	X		X			X	X			X	X				X	X			X	X			X			X		X	X		
	Web based solution	10		X	X			X			X					X					X			X	X						X		X	X		X	X
	Software solution (SaaS)	3								X									X	X																	
Development phase themes	Users, needs, testing with users, feedback	25		X	X		X	X	X	X			X			X	X	X	X	X	X	X	X	X	X		X	X		X	X	X		X	X	X	
	Study competitors, markets, product-market fit	11	X				X			X			X				X	X			X			X	X		X	X			X						
	Funding related talk	10			X	X	X				X							X	X								X	X	X						X		
	Creating MVP, proto	9		X												X		X	X	X	X	X	X		X									X			
	Collect data, evaluating, measuring	8		X						X	X		X			X		X	X					X													
	Partnering	7		X	X																		X					X	X		X			X			
	Outsourcing (O), or developing in-house (I)	6			I	O	OI												O						OI				I								
	Talking about user experience	6		X					X								X	X																X			
	Talking about exit	2						X																	X												
Moderator	Entrepreneurial learning	22		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X			X		X				X		
	Building team	8					X	X	X				X		X		X				X									X							
	Networks related actions	5		X	X											X													X					X			
Tech arc	Developing technological architecture of the digital venture (T)	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	

2 nd or- der	Actions during development phase 1 st order codes	TOTAL	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34	
Business Model	Value creation	11	X	X			X							Early stage			X			X		X				X			X	X		X			X		
	Talks about scaling	11													X				X	X						X	X	X	X	X	X	X		X			
	Pivoting	5								X	X														X	X					X						
	Monetization related talk	2		X																			X														
	Benchmarking from successful digital ventures (Amazon, Uber)	5				X			X									X	X											X							
Natur	Doubting the idea	33	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	
	Lean, agile way of developing	5								X			X				X												X	X							
Platform	Talk about platforms	26	X			X		X		X	X	X	X		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	
	Market place, two-sides (P)	7														X	X	X	X				X					X					X				
	Community building (P)	6		X											X			X								X							X		X		
	Ecosystem development	2																								X							X				
C	Location talk (C)	9	X													X								X	X	X			X	X				X	X		

Table 5-6 Venture development process actions and number of times mentioned

Actions of venture creation process	Total of 34	Data presented in a separate section of
Developing technological architecture of the digital venture	33	Technological architecture, Section 5.3.3
Platform related talk	26	Role and development of digital platforms, Section 5.3.5
Users, user needs, testing with users, feedback	25	
Entrepreneurial learning related talk	22	Moderators, Micro-level 5.4.3
Scaling	11	Search for business model, Section 5.3.4
Study competitors, markets	11	
Value creation	11	Search for business model, Section 5.3.4
Funding related talk	10	
Creating MVP, proto	9	
Location talk	9	Contextual variables, Location Section 5.5.1
Building team	8	Moderators, Firm-level 5.4.2
Collect data, evaluating, measuring	8	
Building two-sided market place (platform as an outcome)	7	Role and development of digital platforms, Section 5.3.5
Partnering	7	
Community building (platform as an outcome)	6	Role and development of digital platforms, Section 5.3.5
Outsourcing vs. developing in house	6	
User experience	6	
Benchmarking from successful digital ventures (Amazon, Uber)	5	Search for business model, Section 5.3.4
Lean, agile way of developing	5	Nature of the process, Section 5.4.5
Building networks	5	Moderators, Firm-level Section 5.4.2
Pivoting	5	Search for business model, Section 5.3.4
Ecosystem development (ecosystem as an outcome)	2	Outcome, Section 5.3.6
Exit	2	

Table 5-6 presents the actions which emerged from the data in the coding process and the number of mentions. The three most frequently mentioned actions are 1) digital technologies, digital resources, and components used; 2) platform-related talk; and 3) users, user needs, testing with users, and feedback. The development findings include the following themes: build team; create MVP and prototype; data collection, evaluation, and measuring; digital building blocks; doubting the idea; entrepreneurial learning; funding; lean, agile way of developing; locations; networks, outsourcing or in-house development; partnering; pivoting; platform relevance; studying competitors or markets; user experience; users, user needs, testing, feedback; value creation; scaling; and exit.

The following sections present separately the themes of the technological architecture, search for business model (value creation, platform-related talk).

1. *Users, user needs, testing, feedback, and user data*

The themes that emerged when coding the user-related findings when developing the idea were categorised in the following way: automated testing, customer feedback, developing with customers, number of users, other companies' best practices, own testing, testing community or focus group, testing in different locations, and testing with key stakeholders (Table 5-7). Twenty-five of the 34 interviewed start-ups spoke about users, user needs, testing, and gathering user data (see Appendix 8 Tables of detailed findings, Table 12).

Testing with users can be conducted via automated testing or human testing. Automated testing includes functional testing run by developers. Human testing and/or feedback includes customer feedback gathered regarding the prototype; feedback on the user experience; customer testing conducted by working with early users; companies working to develop a prototype; customers giving ideas and needs; testing done with friends and family; and testing with key stakeholders as industry experts.

Table 5-7 Users, user need, testing

Themes	Quotes
Developing with customers	<p>'And we are also working with early users, they are constantly giving us feedback, what specific features they want, so we are collecting data to know what our product roadmap should be like.' (08-SFO)</p> <p>'They [users, customers] are basically deciding what we are doing, they are the ones that give us the ideas and the needs that they have and that's why we always try to put ourselves in their shoes or talk to them to get to know their needs. So, we can make the platform cater what they are actually looking for.' (17-BER)</p>
Iterating user feedback	'At the university I learned a lot from the design centric and the user centric design and iterating user feedback, that is something we definitely do (07-SFO)
Testing with community or focus group	We have a 50 people testing community now, testing all the time. This is not yet released to the open market. So, every time we are using a new version, alpha version basically, they are testing and giving feedback for it. (24-HKG)
Testing in various locations	'And then we went out and methodologically got tested in various market places to see whether we were getting acceptance and support.' (11-SFO)
Testing with key stakeholders	we reached out 100 -200 key stakeholders we thought would be important in Sweden. And that could be anything from tech bloggers to security experts. So, we talked to them via email and invited them to the beta, and this is who we are and feel free to ask any questions etc. And then we also built the beta community for end users to sign up to try out this service before we launched. So maybe we had 1 000 of those before we launched. So, they were great ambassadors. (02-STO)

The number of users of the solutions mentioned in the interviews varied greatly, ranging from 5,000 to 400,000.

2. *Study competitors, markets, and product-market fit*

Several participants (12) discussed the theme of studying competitors, markets, or the product-market fit. They mentioned studying a competitor's process, conducting a case study before starting the development, studying to find the best product-market fit, and conducting market research (see Appendix 8 Tables of detailed findings, Table 10).

We needed to come across the new concept. We studied what the competitors were doing, studied their process (01-HEL).

We are constantly interviewing people, trying to find the best product-market fit, the market segment to start with. So, we have another co-founder who is a businessperson, he reaches out to tens or hundreds of companies a week, and then pre-screen to talk a little bit about if there is any interest. If there is some interest, then we do a second-round interview with them to see like, what are their needs. And then we go back and try to make sense of the data; that is one direction (08-SFO).

Here is an example of conducted market research on how people are downloading apps.

First, we thought we would develop an app that you would download from the App Store, but I might say, one day it might happen, but for now we decided not to do that. We did a market research and we found out that a lot of people are not downloading new applications to their phones in Israel, just like one app in three months on average (22-TLV).

3. *Funding*

Although funding was not directly asked about, participants discussed funding-related topics, such as the amount of funding they had raised (see Appendix 8 Tables of detailed findings, Table 7). The findings show that funding was raised from different sources, including funding from venture capitalists (VCs) or partners with similar goals, funding rounds, funds received from governmental organisations, funds raised from friends, self-funding, crowd-sourcing, seed-round funding, and initial coin offering (ICO). The amounts of funding raised varied from 1,000 euros to 10 million euros.

The funding was collected from seed money and from funding rounds. Some participants struggled financially before receiving funding. Several start-up founders developed their solution first and then started to look for funding:

'We started with rough MVP, and raised money with it, we raised 100k from angel investors with the MVP, and then also we started to attract the first users. The 100k was seed money (17-BER)

(32-HKG): 2015 when we first had the idea. But it took us about six months to open bank accounts and set up the company and find the first batch of founders.

INTERVIEWER: Have you had your seed round or something?

Oh, this is the problem. Unlike other people which go out and get the money first, we actually produce first before we start thinking about that. We did the reverse. Meaning that we are trying to prove something, we actually just launched it, like, what we want. Actually, you can use it. It's not a prototype anymore.' (32-HKG)

4. *Create MVP and prototype*

Findings of the interview data related to creating an MVP, prototype, or proof of concept (POC) included themes such as creating a rough, quick, and dirty MVP; testing whether the idea is possible; and trying and failing with developers (see Appendix 8 Tables of detailed findings, Table 5).

In the interview of the only participating start-up which is not digital, the founder discussed developing the POC:

Yeah, we did test; we gave it out for a few people try it out. We took some revisions and that's how it has taken a good nine to 12 months to evolve. And now we have the POCs (proof of concept) complete (18-BLR).

In discussing how the MVP is made and how it is used for testing, one founder called the MVP 'a reflection on the water':

We created very quickly a prototype and we had a first cold call and first meeting with a big energy company, and in that first meeting they bought our idea and both our service (13-HEL)

We started with rough MVP, and raised money with it (17-BER)

We build the architectural schema, what will be the modules of this system, we'll connect this one, and here this one, and here we manage process, all kinds of things. And we think how to predict and prevent the problems for example, bottle necks in the system. It is like a reflection on the water, it is going to build something very small, quick and dirty solution (21-TLV)

Some start-ups use the MVP to test whether the basic idea of the venture is possible:

So, we basically built a simple web service where you are just putting your bank credentials, and we went on to fetch that for you from the banks and present that in the web service. That was boring, numbers basically. Then we kind of understood that it's possible to get this data, and what we can do with this data. But the most important thing was that it was possible (02-STO).

Occasionally, creating the MVP involved trying and failing multiple times:

We started to work on a prototype, and just the prototype alone was about one year working on it. And it was literally trying and failing, trying and failing (2018 May, starting 2016, now it's like one year and seven months we have been working on it). We did a prototype, worked on a prototype, and some things were good and some things weren't good. The ones that weren't good, we took it off and we worked on it the whole year. Ah, it was like finding the right programmers, and there was the start (19-LON).

5. *Collect data, evaluate, and measure*

With regard to collecting, evaluating, and measuring data for development purposes of the venture creation process, the themes were collecting data for serving or better under-

standing customers, examining the data and testing a hypothesis, using analytics for developing, validating the idea with data, and using WeChat analytics (see Appendix 8 Tables of detailed findings, Table 6).

One founder spoke about collecting data to better understand and serve the customers:

We are trying to collect as comprehensive profiles of people as we possibly can, to make our matching algorithm as smart as possible. And also to deliver the best service to the client; the more data you have of your clients, the better you can cater them (17-BER).

6. Partnering

The concept of partnering arose as a way to develop the idea and solve problems (see Appendix 8 Tables of detailed findings, Table 9). There were mentions of partnering with larger companies, a design partner, a municipality, and an industry partner.

One design partner is a huge publisher. They have two-sided business; they are a publisher and one they generate revenues from ads. They also have a software solution for publishers, which allows them to create polls and quizzes using this software. So, they have implemented our code, so every need that they have to correct something, they contact us, to make sure we are able to do that, and if we are able to do that they just go ahead and log in to our platform and they do it by themselves (21-TLV).

Moreover, partnering can provide a solution to an industry-specific problem.

And second, most important was, how big are the flows, are they significant enough for this. It was also because we wanted the test setting, the proof of concept. So that's the part of the reasons we went to these countries and build the networks there. And it took some time. We didn't think so much about the legal side, because we were thinking we were just going to be the intermediary. And then, actually, the place where got into a little bit of trouble was in Sweden, because we had one bitcoin exchange firm here we were working with, both the tax authorities and Financial Authority, and the banks in the developing stage of blockchain industry, they haven't been all that helpful to bitcoin exchanges even in Europe, and one of the points of that was that they could not operate with unlicensed companies like us, so basically, they had to throw us out. So, if we are familiar with the legislation and we can just follow the necessary procedures without obtaining the licence ourselves, and we can work through licenced partners. (14-STO)

7. Out-sourced versus in-house development

The theme of outsourcing versus in-house development emerged in the findings (see Appendix 8 Tables of detailed findings, Table 8). Table 5-21 lists the outsourcing locations.

The question of whether to develop in-house or outsource seems to be in constant flux:

... we had an outsourced app. We didn't like that. So, we started to hire some engineers in 2013, in the beginning March. Now we started with a prototype in July, the summer it was with these guys, that our partner developed the first version of the app. That's when we launched the beta version, and then that's how we launched also the full version in January 2014. But in the meantime, we hired a number of engineers, 3 actually, one Android, one iOS, and one what we call the backend platform engineer. We've replicated the whole platform from scratch. We wanted to have everything in the house.' (03-LON)

It [mobile app development] was outsourced to Pakistan and then to Brazil, but I am based in London. (19-LON)

'About 10 developers in house. Plus, we used the WhiteSource, and out sourced services whenever we needed.' (23-HEL)

8. *User experience*

The user experience theme was mentioned in the interviews as being a unique feature of the basic idea (see Appendix 8 Tables of detailed findings, Table 11). It was also discussed in relation to the first-time user experience, the need for a simple-to-use experience, and actively thinking about the user experience during the development process.

9. *Exit and strategy*

One participating start-up had a successful exit:

We sold the company successfully in 2015. It took five years to create it. We went to 230 different cities, and five continents. But the first four years we were mainly operating in four cities. We were learning the ropes, and we were learning the processes of developing our technology. But then the last year we started to scale like crazy, when the process was built and that's when we got sold (23-HEL).

Exit is seen as a future target by some founders:

I've had inquiries. I've had people, you know, express interest. At some point in time, I want to be able to sell this business, and I've got to get it to a point where it's generating the kind of annual recurring revenue that is attractive to such a buyer. And I'm not there. But I have people all the time putting out feelers (06-SFO).

5.3.3 Technological architecture

Table 5-8 presents the technological architecture details and digital building blocks used. The table includes the type of digital outcome, type of company, technology involvement of blockchain and AI, digital resources used, in-house developed technology, and special technologies used. 'In-house' refers to development which is done by the start-up. In regard to recombining digital resources, all start-ups except one used one or more types of digital resources (see also LIST OF USED ACRONYMS AND TECHNOLOGIES). The one that did not was in the early stages of development; thus, this question was not applicable.

Table 5-8 Type of digital outcome of venture idea, digital technology, components, and resources used

	Description	TOTAL	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34																											
TYPE OF OUTCOME	Ecosystem	2												Early stage												X	Very early stages of idea development																																				
	Platform	16	X	X	X	X		X	X		X				X		X	X	X							X		X			X				X		X																										
	Mobile app	16		X		X	X		X			X	X			X	X				X	X				X		X		X			X	X																													
	Web based solution	10		X	X			X			X				X										X	X						X			X	X																											
	Cloud computing services (SaaS, PaaS, aPaaS)	3								X													X	X																																							
	B2B		X					X		X		X			X									X	X							X																															
	B2C			X									X				X													X			X	X		X	X																										
	B2B2C/B2C2B				X	X	X		X		X					X		X	X			X				X		X	X		X			X																													
	C2C																			X	X																																										
BLOCK -	Crypto currencies	4			X											X										X	Very early stages of idea development							X																													
	Bitcoin	2														X																	X																														
	ETH	1																								X																																					
	ICO	1																	X																																												
AI TECH	AI involvement	9							X	X									X				X	X				Very early stages of idea development		X	X					X	X																										
	Deep learning	1								X																																																					
	Machine learning	1																					X																																								
	Big data, data-analyt-ics	3																					X	X																																							
	NLP	2																													X				X																												
	Neuro networks	2								X																								X																													
	ASR technology																																	X																													
	Recommendation tech	3							X																											X																											
	Very early stages of idea development																																																														

	Description	To-	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34		
RECOMBINING DIGITAL RESOURCES	Recombining digital resources	32	X	X	X	X	X	X	X	X	X	X	X	Early stage	X	X	X	X	X	X	X	X	X	X	X	X	Early stages	X	X	X	X	X	X	X	X	X		
	Cloud services, database	27		X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X		X	X				X	X		X	X	X	X	X	
	WhatsApp	1																						X														
	WeChat (China)	3																										X				X						
	GitHub	1																										X										
	HubSpot	1														X																						
	White Source																									X												
	PSP (WeChat Pay)	4				X										X			X	X						X						W						
	FB ads, FB authentication	2								X		X																										
	Jinri Toutiao (China)	1																																X				
	QR Code	6																X	X										X		X	X		X				
	Location based tech	2											X		X																							
	Google Vision library	1											X																									
	Google Analytics	2					X																		X													
	Third party APIs	3								X			X					X																				
	Nano Ledger	1																											X									
IN HOUSE LEVEL	APIs	4		X																		X			X	X												
	SDKs	2				X				X																												
	Encryption	3		X															X	X																		
	Algorithms	5																X							X							X	X	X				
	Reflection tech (BRDF)	1												X																								
	OCR	1										X																										
	PKI	2																		X						X												

Table 5-9 Digital resources and components used, physical assets owned (summary of Table 5-8)

Recombining digital resources and components	# Start-ups using
Cloud services, incl. database	27
WhatsApp	1
WeChat ecosystem (China)	3
GitHub	1
PSP	4
Facebook ads, FB authentication	2
Jinri Toutiao (China)	1
QR Code	6
Location based tech	2
Google Vision library	1
Google Analytics	2
Third party APIs	3
APIs	4
SDKs	2
Encryption	3
Algorithms	5
Reflection tech (BRDF)	1
OCR	1
PKI	2
Ledger Nano	1
Owns physical assets no/yes	32/2

5.3.4 Business model search

The search for a BM is essential for start-ups, as ‘any act of entrepreneurship means the choice of a business model’ (Foss and Saebi, 2016, p. 220). Due to the importance of the BM topic in this research, the findings are presented in this separate section. In the findings, the term ‘business model’ is seldom used. Instead, the participants spoke about pivoting (changing some elements in the BM), looking for scalable alternatives in development, and creating value for users and customers.

1. Pivoting

The following table presents data related to pivoting (see Table 5-10). Participants spoke about not having a viable business and looking for new idea and pivoting by changing the BM in some ways, a turning point.

Table 5-10 Pivoting

Themes	Quotes
Not a viable business, new idea based on customer re-search	'The second critical event, in my opinion, was us realising the first idea is not something that can work, be viable. It's <i>not a viable business</i> at the moment. It might be viable for an established company, but definitely not a start-up idea. So, finding the courage to say, scrap that, new idea based on the customer research' (08-SFO).
Pivoting	<p>'We make a lot of money, \$8–9 million USD revenue this year; it's pretty profitable. Our company was founded in 2016, so it grew fast. Ninety percent of the revenue comes from advertisements in the email. Technically, we registered our business in 2015, but the way it is now is not what it was, <i>we pivoted</i>' (09-SFO).</p> <p>'So, we realised that we cannot win that peer-to-peer dispatching, so we closed that completely and focused purely on the pre-bookings in travel ecosystem. So we scoped down what we wanted to do with the technology. And focused on the integration part and integration platform, instead of B2B dispatching system. But that was not to be. So, we have to sort of explain to investors that we need to take a completely different direction and that's going to be less valuable, less than our original plan. Then <i>we pivoted</i>. Then we started developing the integration platform, the APIs, the capability to do integrated dispatching systems to the global distribution system and piloting with the global distribution system the whole technology' (23-HEL).</p> <p>'The first year was, let's say searching for the user case to start with and we were pivoting quite heavily. We had multiple tries, we were visiting different markets discussing with multiple companies. This is a truly global company' (24-HKG).</p>
Turning point	'I think what completely changed my direction from wanting to build a technology product, to starting with consulting, if that could be a turning point. Because I've always been like more about technology. And then until I talked to my clients and I realise that, at least for my sector, it's still kind of important to start with consulting, and then launch the product. And do it and then you already have an established relationship' (28-PEK).
How to cash out of traffic that you got, maybe do something more	'No, it's more like when you are providing a lot of content, while at the same time you will be thinking about how to cash out of the traffic that you got. And the traditional way is to get more ads, commercials. And that's what it did. And also, still doing right now. That's one part, cash. And while I am still thinking maybe I can do something else. Maybe I can do something more. I just came up with this idea, and maybe I can sell stuff through this article. I can write an infomercial. Like providing them with some suggestions on how to shop on a day-to-day basis' (29-SHA).

The pivoting findings include the iteration or changing of the BM, (i.e., pivoting). The reasons for pivoting included not being a viable business, changing the business field, focusing on an integration platform, changing from B2C to B2B, iterating the BM with user cases, listening to clients, and how to cash out of traffic that you got.

2. Value creation

Another theme closely related to BM is the value creation theme, as the business model aims to 'create value by exploiting the underlying opportunity' (George and Bock, 2011). Table 13 in Appendix 8 presents detailed value-related findings. The themes from the value creation findings included lowering costs, adding safety, answering customer needs, being simple to use, offering quality service, saving time, and earning value (Table 5-11).

Table 5-11 Ways to create value in the digital context

Themes	Quotes
Lowering costs	<p>'If they would do that alone, it would not be as cost-efficient, as using our platform'. (01-HEL)</p> <p>'Better analysis and cheaper prices.... Okay, so the first part is that standardised product allows to have better analysis because when you're consultants, people are prompt [prone] to human mistakes. And the second part is that it is very price friendly, especially for medium and small businesses'. (28-PEK)</p> <p>'We are at least half the price. So that's the competitive advantage; we are cheaper, and we still retain the same accuracy and even better'. (27-PEK)</p>
Safe and free	'I am giving them the opportunity to store their memories safely and to go back in time and, if you like, in the future, go back in time and relive the memories for free'. (19-LON)
Customer need, B2B	'Providing them services that they want and need. So as long as we are close to them, are able to answer their needs, we are bringing value to them'. (15-BER)
Easy to use	<p>'We solve two basic problems. The first is that we make it simple to have multiple bank accounts, so that has been a problem before, cause you kind of need three or four different web services to log in to and now it is all of a sudden one. And it is not only one but you can get that holistic picture instead of getting some assets, some costs, or income, you get the whole picture. The second one is we do a lot with the data to help the user to understand her finances'. (02-STO)</p> <p>'We'll deal with all the optimisation staff, trying to make it easy for you to use'. (08-SFO)</p>
Better quality service	'The value that the customer will get depends on one side the quality of the service it will provide. And the video editor has been able to cut his editing process in half by using our software'. (33-DUB)
Earning value by using the apps and services	'The value pyramid of mobile... we started with where communication was the value, then we jumped into smartphones; let's say that the online shopping aspect and gaming, and social entertainment aspect became the value. If we want to kind of compete in this area, we need to jump on the next level. You cannot compete on the same value level with the existing players. The next level, the only thing I can imagine is that you start earning value'. (24-HKG)
On-demand service	'We can make the verification on demand, as we are doing right now. We can do it actually all the time'. (20-TLV)
Real-time data One-stop platform	'First of all, it is not that easy to get real-time data in Hong Kong. You really need to be in this industry and know the vendor to get that data. And also, it is a bit costly to get data right'. One-stop platform for buying financial products'. (HKG-32)
Saves time, fast service	<p>'With our solution that we have created, we could have done it in about 30 minutes tops'. (21-TLV)</p> <p>'We give our customers the opportunity to get fast and direct feedback from their clients'. (BER-15)</p> <p>'Saves them a lot of time. They don't have to do their research about different products, different cosmetics, or clothes'. (29-SHA)</p>

3. Scaling and growth hacking

The concept of scalability came up in the interviews, either when the founder explained the venture creation process or when they were asked about the next steps. Scaling is related to the type of business model (e.g., the platform BM uses the network effect for

scaling). Scalability was mentioned in 11 of the 34 interviews, and the quotations can be found in Appendix 8 Tables of detailed findings, Table 14.

Looking for growth or growth hacking was mentioned with regard to seeking new areas of use for the service

'We first offered it to different advertising companies and started working there. But then we started to think where can we deploy it in other areas, and we decided we can go wider, not only advertising. But now it is pretty popular among advertising.' (20-TLV)

Mentions related to targeting scalability in the development of the idea and BM included references to seeking a scalable product-market fit, having a frictionless system that can be scaled, and trying to create a new product which would be scalable. In addition, one founder mentioned the possibility of scaling with a community.

'Then the second thing is, we need to get community scaling. I don't think that any start-up will scale without a real community. And that means that we need a kind of early community, in a scale of tens of thousands of users. And then in order to really scale, we need to sign in some very large operators or device manufacturers who will license this solution.' (24-HKG)

4. *Benchmarking from successful digital ventures*

When searching for the BM, founders compared the target of the venture outcome to become something like a successful venture, but in another context. Start-up founders benchmarked successful digital ventures such as Amazon, Uber, Mint, Starbucks, and Linux.

'We saw a company called *Mint* and they did was that on behalf of the user they aggregated the data from the banks to present one holistic picture in a service, basically you can aggregate all data from the bank accounts into one service and get overview, transparency and build that digital environment that the bank wasn't able at the time to provide. And we thought that if this industry is going to change, it's kind of a luxury place to be, on the consumer side, data driven, helping her with something. And we felt that this is a great starting point.' (02-STO)

'We had been brainstorming with mobile payment at *Starbucks*, *Google Wallet*, 02 wallet was not working, VISA had some wallet for e-commerce called wedot.me, which was a complete shamble. We had giants that didn't make it work. We started to look at Starbucks, what they are doing, and we had a moment of AH, that's interesting. What was interesting is that it came from the retailer. we would try to almost copy Starbucks. We didn't copy like for like the UI or UX, we copied the general concept, the QR code based, you got your point directly via app, you get your digital stamps.' (04-LON)

'Long term we want to be the *Amazon* of the airport.' (07-SFO)

'Because this *DaWanda* is something like an idol or so or something where I would say our marketplace the most the best comparable. And. Probably the most competitive platform is DaWanda, because the target audience is very similar. And the biggest difference is that they are very focused on textile and clothes and so on. And I mean they also have a small area for or category for jams so small but you see that it's a it's a different approach.' (16-BER)

'Similar to what *Linux* was to operating systems and *Android* was built on top of it. To build a good experience and application ecosystem.' (24-HKG)

'What we offer to an event organizer is that we are at least half the price. So that's the competitive advantage so we are cheaper and we still remain retain the same accuracy and even better, because in the

feature we want to build a platform to connect interpreters with event organizers. It's like an *Uber* for interpretation if you will, or digital interpretation if you will. So, you can go to the phone and you can see ratings. And you can see what is their specialty ...' (27-PEK)

5.3.5 Role and development of digital platforms in the venture creation process

This section presents the findings of the roles and meaning of digital platforms in the venture creation process. The role of digital platforms is divided into two areas: 1) the role digital platforms play in the venture creation and development process by providing technological infrastructure; and 2) a digital platform as an outcome or solution that emerges from the development process. Findings with regard to the essential nature of platforms are gathered below in the interview quotations, and detailed findings are in Appendix 8 Tables of detailed findings, Table 15.

1. Role of platforms in venture development process

Platforms are an essential part of the venture development process in several ways. They are a backbone of technological architecture; the business is built on platforms; they are used for marketing purposes; and platforms provide tools for technological development.

There are mentions of platforms being a backbone, or the whole business being based and built on platforms. Platforms provide on-demand (pay-as-you-go) cloud computing services which are used to build the start-up's digital infrastructure. Platforms enable the development of a digital venture with little investment.

'The whole business is on digital platform, so they are the backbone today. Huge. We built a digital platform, it is a part of our idea. Of course, it has a huge importance. There are a lot of web platforms out there, Facebook, Instagram, SAP.' (18-BER)

'I guess in many ways digital platforms were a huge part of my ideation, if they would not have existed, the entire industry behind them wouldn't be existed and my idea would not have been possible.' (21-TLV)

'We are using the AWS as a provider for the infrastructure, I am used to Google services, it is very similar to AWS. With my previous services I was using the Google Cloud.' (20-TLV)

'We try not to, we are currently completely based on Amazon, we use Amazon services for that. It's pretty easy to get stuff up and running, using this ready-made platform. Our platform is implemented on top of AWS, right, it's kind like application running on AWS.' (08-SFO)

'That is hard for me to say, because that is all I know. When we talked about what servers do we own, never in a million years did I think of buying a server. I never even thought about that. Amazon Web Services is a platform, Facebook Advertising is a platform. I mean our whole business is running on platforms. That is like all we do. We are a platform in a sense. In terms of hardware versus software, this is like (my conference equipment and my computers) the only hardware I ever bought. Our start-up costs were 100\$. It cost more to start my hot dog stand than to start this company.' (09-SFO)

In addition, platforms are used for marketing purposes and serve as the means for sending tools and data.

[Role of platforms] I guess everything. Because the tools and the data we send is often sent through digital platforms like Google Ads and Facebook. My clients are buying media from these platforms and in order to optimise their media campaigns, they are sending user engagement data from the website back to these platforms (21-TLV).

Platforms are used to build the solution on the platform, as in the case of WeChat. This is defined in this research as a platform-based outcome.

WeChat is an app which is very popular in China and they have like little apps. The little app is very easy to develop. It's not expensive and it's very cheap. Normally, if you need to start, like you said, the digital e-learning course, you may need to develop an app, right, the mobile app, but now you only use WeChat as a platform for courses. It's much easier to develop (26-PEK).

Platforms can be used for authentication and sign-in for the venture. Examples of these authentication and sign-in possibilities are offered via Facebook, Google, and LinkedIn.

We use Facebook and other authentication for logging (07-SFO).

In China, the multipurpose super-app (Zhang, 2018), namely the WeChat digital platform, is used for venture development. This platform includes services such as messaging, social media, and payment (WeChat Pay). The WeChat platform has 1.1 billion monthly active users (MAU; (Statista, 2020), which is a huge user base for gaining attention.

'Cause right now at this point of this game, the product, you know, the merchandise, is not the most important thing, because you can get all the merchandise and products from various sources with a really low price. But the most important thing is the attention, because each day we only have so many hours awake, and most of the time we spend, here in China, most people spend on their mobile phones., they spend on WeChat. Like 30 percent of their time of the day, more than that. That was just a humble guess.

INTERVIEWER: What about the payment part, is the payment part included in WeChat?

INTERVIEWEE: It is included in the WeChat, because WeChat has the payment function as well, it's called the WeChat Pay. So, they can pay through WeChat or they can pay with their credit card.' (29-SHA)

2. Platform as an outcome

A digital platform is one of the outcomes of a digital venture development process. Table 5-12 presents the different types of platforms as outcomes. China-based digital platforms as outcomes are presented separately due to their different nature. The Chinese platforms (e.g., WeChat, Jinri Toutiao) are digital ecosystems which include various features and components (e.g., chat, news, payments, e-commerce).

Table 5-12 Types of platforms

Location	Platform type	Description	No of mentions
Europe & Middle East,	Consumer engagement platform	rewarding end users for online shopping and community engagement	3 (04) (15) (24)
	Integration platform	Integrating various solutions into one platform (e.g. marketing applications, sales applications,	3 (06) (21) (23)

Location	Platform type	Description	No of mentions
Americas, Africa, Asia (India)		CRM, project management, event management, work flows)	
	Platform as a market place	Providers of the services or products on one side and on the other side the consumers/clients/ users	8 (14) (15) (16) (17) (18) (22) (27) (32)
	Total (platform as an outcome)		15
China	Chinese digital platforms/ecosystems (WeChat, Jinri Toutiao based solution)	Solutions using e.g. 'mini programs', an app that's based on digital ecosystems (WeChat, Jinri Toutiao, e.g. WeChat Pay, messaging & social WeChat, gaming, Tencent cloud, music, video), or using WeChat as advertising (vs. Facebook)	3 (26) (29) (31)
Western world and China	Total of platform-based outcomes		18/34 (53 %)

The total number of outcomes, which are either platforms or platform-based, is 18 out of 34 (53 %).

3. Platform development

When developing a digital platform (Table 5-13), building a community is important for several reasons including testing, development, crowdfunding, and scaling. Another character of platforms is their role as a marketplace, either serving as a two-sided or a multiple-sided platform for different actors to access a market for the exchange of goods, services, or value. A challenge of building a platform is to find the first-use case and solve the user's real problem.

Our problem is that what we are developing is a platform. People are talking quite a lot about platform start-ups and so on. Actually, it is very difficult to develop a start-up platform, because they are usually missing a use case, before someone is building a use case on top of the platform. That has been our challenge. It makes sense to build a platform, because probably your success is higher, but then you have the problem that you are not sure if you are solving somebody's real problems in the beginning (24-HKG).

Table 5-13 Themes of digital platform development

	Themes	Quotes
	Use case	'It is very difficult to develop a start-up platform because they are usually missing a use case before someone is building a use case on top of the platform' (24-HKG).
BUILDING A COMMUNITY	Building different types of communities	'We also built <i>the beta community</i> for end users to sign up to try out this service before we launched' (02-STO).
		'Have organised <i>a user club</i> which is like outside of our team but kind of a part of our community to get insight and input into our development' (13-HEL).
		'We are doing other things like financial literacy, and maybe chat room forum, building community, <i>building learning community</i> etc., improving the education tools etc.' (32-HKG).

	Themes	Quotes
	Community needed for crowdfunding	<p>'You can only be successful in a crowdfunding project when you already have a community around you' (16-BER).</p> <p>'We arrived at this final product that we have currently on our website today, which is the first crowdfunding platform that is financed by the brand and activated by the community' (34-PAR).</p>
	Community needed for scaling	'This is also a platform for applications to provide their services and rewarding their community. Then the second this in, that we need to get community scaling' (24-HKG).
DEVELOPING A MARKETPLACE	Two-sided	<p>'From the client side, it is an app you can send transactions' (14-STO).</p> <p>'We develop platform B2B and B2C. We care about the business side but also the customer side' (15-BER).</p> <p>'It is about a one-stop platform for trading financial products, also including option, structured products' (32-HKG).</p>
	Community marketplace	<p>'... using the platform for different purposes. ... It's a marketplace, definitely. And she, for example, she told us to call it <i>community marketplace</i>' (16-BER).</p> <p>'Marketplace for services. The vision is that anyone with any talent can come to our side and monetise his talents. And that person who needs something, whatever services it should be, he could find it on our platform' (17-BER).</p>
	Three-sided	<p>'<i>Volunteers, the elderly and social workers, three dots in the circles</i>. Basically, the more ... the new thing about the platform for the new generation, is how to do the volunteering in an innovative way' (22-TLV).</p> <p>'We are a content provider ... we are somewhere in the crossroads of podcasting, streaming, and translation. I think it is going to be a light podcasting translated platform basically' (27-PEK).</p>

5.3.6 Outcome (emergent outcome)

This section presents the types of emergent and evolutionary outcomes the studied ventures have developed. The findings of outcomes are listed in Table 5-14, by type and by number of outcomes belonging to a certain type. The outcome can be in several categories simultaneously; for example, an outcome can be both a mobile app and a platform.

Table 5-14 Process outcomes at the time of the interview

Outcome	Examples of quotes	TOTAL
Ecosystem	And what is our role is to build a good user experience on top of this quite raw technology base, like a blockchain and multiple other emerging technologies. Similar to what Linux was to operating systems and Android was build on top of it. To build a good experience and application ecosystem. We build kind of a middle ware for the users, it is similar like Linux, you have to build something on top of it, to make it easy. There is one usability problem, that is being able to do transaction on blockchain, there's a cost payed in cryptocurrency. In Ethereum blockchain you have to pay in ETH the transaction, so none of the normal consumers will understand, what is this ETH, how do I buy it. So, we have built a service, we call it pay my cash –service. This is called cash, this ETH. So, we have a service, where third party can sponsor these transactions, so that the end user doesn't have to understand or see anything about the ETH. That is one example what we are building in here. (24-HKG)	2
Platform	We are a consumer engagement platform for retailers and brands (04-LON) A complete customer data platform. (06-SFO) It's community marketplace (16-BER) We are a digital platform, we were thinking that that's the future, and we need to be in platform business, which enables people. Market place for services, the vision is that anyone with any talent can come to our side and monetize his talents. Then we thought that mobile first, because the smartphone would be super easy, but that turn out to be wrong. So now we only have web application, that is also mobile responsive, but we kind of draw back from the app because few were only using them (17-BER) See also Table 5-12	16
Mobile app	It is only going to be an IOS and Android app. It is mobile only. (10-SFO) We are a product, that's providing a service. So right now, I give you a digital asset, called an app, that you use and yet, that app is really facilitating a service to connect you to other people within that area. (11-SFO) Webpage and an app, and you can access your videos on app, you can access your videos on both, you can access on web and you can open your videos on smart TV as well (19-LON)	16
Web based solution	So, we wanted to keep the advantages of the WhatsApp, but still be able to be more technological and able to do analysis on the data, and to manage the whole process in a better way. So, we developed a web application, and we publish a very brief message on WhatsApp and send it to the Web. (22-TLV)	10
Software solution (SaaS) (aPaaS)	We just rolled out the first user, we finished the project we had with them, we need to renegotiate our terms and figure out how we are going to engage in solidified relationship. And we need to figure out how to add more people, because we are an infrastructure, and that's always a tricky thing, right. You need to build a lot of stuff before it actually becomes useful ... It's a cloud hosted tool chain, our tools are in our cloud, users can just use them as a service. (08-SFO) We are a SaaS service. My clients are buying media from these platforms and in order to optimize their media campaigns they are sending user engagement data from the website back to these platforms. (21-TLV)	3

Table 5-15 presents a summary of the interviewed start-ups according to their emergent digital outcomes and whether they were still active as of June 2020.

Table 5-15 Type of outcome at the time of the interview, status of activity

Start-up ID	Launch time/no	Type of outcome at time of interview 2016 - 2019	Remarks	Still active June 2020**
01-HEL	2013	Platform		1
02-STO	2013	Platform, Mobile App		1
03-LON	2015	Platform		1
04-LON	2013	Platform, Mobile App		1
05-HEL	2016	Mobile App		1
06-SFO	2010	Platform, Web-based solution		1
07-SFP	no	Platform, Mobile App		1
08-SFO	no	Software (cloud), aPaaS		1
09-SFO	2016	Platform, Web-based solution		1
10-SFO	2018	Mobile App	App not existing any more	
11-SFO	no	Mobile App	App not existing any more	
12-SFO	no	early stage	discontinued	
13-HEL	yes	Platform, Mobile App, Web-based solution		1
14-STO	yes	Mobile App		1
15-BER	no	Platform		1
16-BER	2017	Platform		1
17-BER	2016	Platform		1
18-BLR	2018	Mobile App		1
19-LON	no	Mobile App	dissolved	
20-TLV	2018	Software (cloud), SaaS		1
21-TLV	yes	Software (cloud), SaaS		1
22-TLV	2018	Web-based solution	discontinued	
23-HEL	2009	Platform, Mobile App, Web-based solution	exit	1
24-HKG	2016	Ecosystem, platform, mobile App		1
25-PEK	no	early stage	not able to check (in China)	?
26-PEL	2016	Mobile App	not able to check (in China)	?
27-PEK	2018	Ecosystem building, mobile app		1
28-HKG/PEK	2018	Web-based solution	not able to check (in China)	?
29-SHA	2017	Mobile App	not able to check (in China)	?
30-SKG/SOA	2016	Web-based solution		1
31-SHA	yes	Web-based, Mobile App	not able to check (in China)	?
32-HKG	2018	Mobile app (IOS)		1
33-DUB/PAR	yes	Web-based solution		1
34-TLV/PAR	yes	Platform, Web-based		1
		TOTAL still active		24

** Still active = 1

Venture creation processes vary, and the actions taken during the development phase vary, see Table 5-5. Four examples of venture creation processes are presented, categorised by digital process outcome. The examples are taken from ventures that are still active in 2020, have access to funding, and are in different locations.

1. Venture creation process of mobile app or web-based application software (see Appendix 9)
2. Venture creation process SaaS and aPaas (cloud) software solutions (see Appendix 10)
3. Venture creation process of digital platforms (see Appendix 11)
4. Venture creation process of digital ecosystem (see Appendix 12)

5.4 Moderators and the nature of the venture creation process

This section presents the findings related to moderators (i.e., potential moderating factors of the BM iteration), as well as the nature of venture creation process of a digital venture. The moderators of the BM iteration are divided into macro-level, firm-level, and micro-level (Foss and Saebi, 2016), and the findings use the categorisation from the theoretical framework (see Section 3.2.2). The nature of the venture creation process refers to how the process is described by the participants. The nature of venture creation process and the critical events are presented in separate sections in this chapter as follows: macro-level (5.4.1), firm-level (5.4.2), and micro-level (5.4.3) and moderators; the nature of the venture creation process (5.4.4); and critical events (5.4.6).

5.4.1 Macro-level

The macro-level themes included laws and regulations (European Union General Data Protection Regulation, GDPR; regulations regarding financial organizations), external competitive environment (Apple and Nokia changing policies), and technological advancements (blockchain and FinTech). See Appendix 8 Tables of detailed findings, Table 19 for detailed findings.

5.4.2 Firm-level

Firm-level moderators in the theoretical framework include vision, values, culture, design, founder team, and networks. The detailed findings are in Appendix 8 Tables of detailed findings, Table 20. The themes of the findings from the interviews were related to company vision, mission, founder, team, and network.

1. *Vision*

Vision or mission was e.g., to democratise opportunities.

We define our mission to democratise opportunities. It means that free information flow, education flow, capital flow in the planet, no matter where you live (24-HKG).

2. *Founder and team*

Founder- or team-related findings included the challenge of finding a chief technology officer (CTO).

The second one is to find the CTO. And that is just out of my control. I don't know when I'll meet the right candidate. And the third is fundraising. And the fundraising part is very closely tied to finding a CTO, because I always get asked who is your CTO. We trust you, but there's only you and that's not a team. So, I feel like even if I take my time with finding the CTO, the VCs don't wait (28-PEK)

3. *Networks*

Participants built networks with regulators or with industry ecosystem stakeholders. The following quotations are from the FinTech sector:

For us, it is important to have close ties to regulators (02-STO).

I can't put all my time just on (developing) this, and I have to do other things like regulatory, maybe talk to the SFC (Securities and Futures Commission) on other stuff (32-HKG).

The needed networks may be governments or international organisations.

It could be anyone from either the governments, or it could be it could be people in the UN. And as long as we can keep talking with the right people, they want to make a difference (04-LON).

Start-up communities were also seen as important and useful networks.

We are now working with a lot of these start-up communities, WeWork and so forth. There's a lot of interest from that because it's naturally international community and they are interested in our solution. So that is like the entry point, the actual start-up community itself that got us the first kick and boost to get the recognition and get the people to believe that we can do something (27-PEK).

5.4.3 Micro-level

In the theoretical framework, the micro-level moderators include a digital start-up mindset and entrepreneurial learning. The detailed findings are in Appendix 8, Table 21. Entrepreneurial learning is presented separately due to the importance of the subject.

1. *Start-up mindset*

Start-up mindset refers to knowledge, capabilities, and personality traits such as digital technology skills, learning, flexibility, agility, risk-taking, bearing uncertainty, and delayed traction. The following two quotations are examples of a start-up mindset:

The thing that I learned the most from all my previous businesses are patience. One hundred percent, like I am the guy always that wanted to do myself and I always wanted to do it quick. And all the other businesses taught me I need to wait. For you to do business as I am doing now, is literally investing in your future. You are not going to see the results quickly, it is not like you are opening a restaurant and you are doing marketing and in one month you see income coming in and you're set. On app, you launch the app and it can be years before you see some traffic and then you need to figure out how you are going to make money with that. And then it is like completely different scenario that I literally have to pass all those businesses before to get to what I am and what I am doing at the moment.' (19-LON)

Patience, which is also called 'delayed traction' (Zaheer *et al.*, 2018), refers to bearing uncertainty and being able to take risks.

It's quite complex situation when you are especially building something, which is not existing yet. Although it is extremely painful to have an iterative approach, I think it is necessary for success. As a probability game, if you are building totally disruptive, your probability to succeed is like, ok, we decided in the beginning that we decided to solve this problem, and will work next two years to solve that, the probability to succeed is less than two percent, I think. Because you just don't know if that is the right direction. That is why, if you have an iterative approach you can manage the probabilities and survive. (24-HKG)

In the above quote, technology skills are not mentioned; however, this particular start-up is involved in blockchain technology.

The ability to take risks and bear uncertainty is part of the start-up mindset. One question was about the confidence the entrepreneur felt in the venture idea during the development phase. All interviewees except one said they had doubted their idea or the process.

2. Entrepreneurial learning

Entrepreneurial learning during the venture creation process was gathered by an open question (Question 11, **Error! Reference source not found.**): 'Looking back, if you could start from the beginning now, how could you have developed your business idea faster or with less effort?'. The detailed findings are in Appendix 8, Table 22. The themes mentioned most often with regard to entrepreneurial learning were the importance of a strong team, the need to develop faster, focus, marketing, studying the market, and technology. Table 5-16 presents two themes of entrepreneurial learning: the need to develop faster and the need to focus on things that matter.

Table 5-16 Entrepreneurial learning, need to develop faster with better focus

Themes	Examples	refs
Need to develop faster	<ul style="list-style-type: none"> – invested more in developers, launching fast – having more money help to proceed faster – tension of moving fast but also slow enough to learn – make prototype earlier – make prototype differently – be less quick and dirty, be more organized – ICO earlier 	7

Themes	Examples	refs
Focus on things that matter, not to waste time	<ul style="list-style-type: none"> – focus on things that matter – started talking to investors too early, wasted time on meetings instead of just working with more with the idea – the foundations that you built upon were incorrect, had wasted a lot less time doing the wrong thing if had known what the right thing is – product could have been even more simple – wasted time on crowdfunding, not knowing how it worked. Would have saved like three months without it. – had a good code and always spent too much time on things that could have been quicker 	6

5.4.4 Future (diffusion and impact)

The interview guide inquired about the future as a theme, and the detailed findings are in Appendix 8 Tables of detailed findings, Table 18. Questioning about the future brings a dimension of uncertainty to this research; most of the semi-structured questions are retrospective in nature. Findings related to future growth include generating sales, expanding internationally, and raising funding. Other themes regarding the future of the venture were to make an exit and found new companies, to start monetising and iterating further the business model, and the talk about future risks. The following quote elaborates risks and the unknown future:

There are so many risks, everything from competition to security risks ... If our company is not successful, then we probably have to raise more money. And if our company is successful, we probably have to raise even more money, because then you want to scale it faster. So, funding is a risk always. Now we have a good funding market for many years and it might change. I think, our company can turn out to be fantastic or it can turn out to be very mediocre. We don't know yet. And that is kind of what's interesting about this, if you are a big company, what I am doing is not going to make any difference, and here what everybody does makes a huge difference. That is really rewarding to work at this place, when you don't know what's going to happen. (02-STO)

5.4.5 Nature of venture creation process and entrepreneurial journey

According to the theoretical framework of this research, the nature of venture creation process is dynamic, iterative, and cyclical (Levie and Lichtenstein, 2010); fluid and less bounded; and temporal (Nambisan, 2017; von Briel, Recker and Davidsson, 2018), meaning that, in the digital technology context, the development phases are not clear and can change rapidly 'in repeated cycles of experimentation and implementation' (Ries, 2011; Nambisan, 2017). The blurred nature of the process is due to the distributed entrepreneurial agency in digital ventures, the iterative BM search, and the recombination of digital resources (Henfridsson *et al.*, 2018). The dynamic and iterative nature of the process is caused by rapid changes in the competitive environment, uncertainty, and constant risks during the venture creation process.

The themes describing the nature of the venture creation processes of participating digital start-ups are constant iteration, doubting the idea, evolving the idea and BM, long- and short-term goals, and lean and agile ways of developing (see Table 5-17). The detailed findings of the nature of the venture creation process are in Appendix 8 Tables of detailed findings, Table 23.

Table 5-17 Nature of venture creation process (extract)

Themes	Detailed characters
Constant iteration	<p>Product-market fit search: Original business model was to sell the licenses online, made some modifications to our plans and now we have two different approaches to find the product market fit</p> <p>Iterating, pivoting and looking for a direction of the development</p> <p>Iterating, going to the field and meet people, emerging outcome</p>
Constantly doubting and evaluating the idea	<p>It is constant up and down about how you are feeling and how much you trust it. So, you definitely doubt it and sometimes you think this is the best thing that has ever been created and sometimes the worst.</p> <p>All the time. It's not doubting the idea, I mean, I know that it will work, if we just do it correctly. It's more like do we find the best way to do it.</p> <p>Every day. Every day I am doubting, if this is the right thing to do. But I think through that process of doubting you also get new ideas, you improve your idea.</p> <p>Not the idea, but our capability to actually to pull it through. I am constantly evaluating that are we on the track to be the ones who are able to do it, or not.</p> <p>No, we're sure that this is a good idea. Yes, but we will change our ideas if the times or the society changes quickly.</p> <p>Yes. I keep doubting. Every day I'm thinking you know if there is anything wrong, whether I need to tune it. Because the world is changing, evolving every day. So maybe something that was correct yesterday may not be correct tomorrow.</p>
Evolving idea	<p>Idea evolved, two things coming together</p> <p>Started with content, idea came into my mind, maybe I could use this to be an e-commerce, the idea is developing along the way. It doesn't develop in one day</p>
Lean and agile way of developing	<p>iCore and Lean start-up methodology used, but when a technological platform infrastructural company, engineers react better if you give them something first</p> <p>lot of different ideas on the table, go out to the market and start interacting, do market research, identify people who are interested in the concept, is there a need, do we have a product-market fit</p> <p>website and mobile content only in the beginning point, but the design has to change. The functions are ok, they are working. Having the first big client, then have a lot of traffic, and have to make sure that the traffic is ok, right now not scaling, only developing</p> <p>testing the product, get feedback, and actively seek for people and try to push wherever we can. Get feedback and analyse that, what are the opportunities, what we have, what are the costs of going to a certain direction. Do week sprints, kind of a lean development in certain sentence.</p> <p>Trying to follow the lean B2B methodology. The Lean start-up is more B2C. So, you come with the assumption and then you try to validate your idea. But with B2B, clients are professionals they don't buy because it's fun, they buy because they need it.</p>

5.4.6 Critical events

The findings of critical events that occurred during the venture creation process are presented in Table 5-18 and Table 5-19. The participants identified what they considered to be critical events during their venture creation process. The critical event data show two meaningful themes: first, what is considered a critical event; and second, how the critical event moderated the venture creation process. The interview guide included a question about critical events (Appendix 3, Question sheets A and B, Question 9). Table 5-18 shows a summary of the types of critical events and number of mentions in this research. Team- or outsourcing-related critical events were mentioned most often (13 times).

Table 5-18 Type and number of critical events

Type of critical event	Number of mentions
Team- or outsourcing-related	13
Technology-related	7
Funding-related	7
Business model- or pivoting-related	6
Start-up ecosystem related	5
First customer/user related	4
Radical change in competitive environment	3
Partner-related	2

Table 5-19 includes a presentation of an extract of the critical events. See Appendix 8 Tables of detailed findings, Table 25 for details.

Table 5-19 Critical events and consequent actions (extract)

Critical event	Description of the event	Actions after the event, meaning of the critical event
Business model, pivoting related (6)	1. Discovered <i>other revenue avenues</i> , like licencing this technology abroad	Iteration of business model
	2. First idea was not something that can work, be viable, scrap that, new idea based <i>on the customer research</i>	Pivoted
	3. Pivoted the whole start-up, towards game type of start-up, critical point or incident that has shaped, what we are now	Listen and build relationships with the customer
	4. Have to <i>move to loyalty area</i> and start rewarding people, possibility to scale this	
	5. Changed my direction from <i>wanting to build a technology product, to starting with consulting, established relationship with customers, cannot compete with existing companies</i>	
	6. Pivot moment, <i>customer tried to pay through the platform but</i>	

Critical event	Description of the event	Actions after the event, meaning of the critical event
	<i>couldn't ended up paying eight times, had to send it back, now only take premium fee</i>	
First user, customer (4)	<ol style="list-style-type: none"> 1. Doubted if this was right, didn't have clients, no money, is this the right business, then <i>at a very desperate moment, one of the clients called and wanted to have an offer</i>, it was a big deal 2. <i>Our first user, committing resources</i>, to the point we have weekly meetings, their engineering team, our engineering team, and just someone who clearly needs what you are building, is willing to invest time and money 3. <i>Have the first big client</i>, we have a lot of traffic, and we have to make sure that the traffic is okay for us; we are not scaling yet 4. Got <i>first actual clients</i>, they bought beforehand 10 events from us, they pay us, we will <i>use our product in events so we got support from them</i> 	High importance of first customers, providing confidence to continue (opportunity confidence)
Funding Related (7)	<ol style="list-style-type: none"> 1. Money has been one critical thing, <i>doing this part time, the progress hasn't been so fast, not able to scale anything</i>. Also, positive thing, because <i>if we would have had the money in the beginning, we actually would have done wrong things</i> 2. Getting first investors, was obviously very, very big boost of confidence, <i>working with angel investors helped a lot to bring their knowledge and making sure, that what we are doing is correct. Angel investor that was a woman, finding somebody that I could really identify</i> 3. Raising money was critical, <i>cannot go without being paid</i> 4. <i>Getting a governmental grant gave us revenues but also misguided us</i> for a while from our original target 5. <i>ICO boom</i> started happening, companies issuing their own tokens, we didn't have that plan. Realised <i>this industry will finance itself this way, and if we don't do it, then we are not going to be the ones competing in this area</i> 6. Running out of money, it was a hot point, living on a credit card. Got <i>personal loan</i> with no contract, got money, hired first developer. Four months struggling, got our first seed (funding), hired people on board, started actually pushing to get the company ready 7. Got the <i>first phase 1 of the Horizon 2020</i>. It was an amazing news and now we are on the phase 2 of Horizon 2020 	<p>Money and funding critical, cannot go long without</p> <p>Bootstrapping, seed funding, angel investors, lacking resources, using resources wisely (lean)</p> <p>Government grants a two-edged sword, may or may not be useful</p> <p>First mover advantages (ICO), being onboard</p>
Partnering (2)	<ol style="list-style-type: none"> 1. Starting with one idea, realising the need for accommodating legal system, although tried to avoid it from start, <i>found joint-venture solution</i> 2. <i>A major airport opened up an RFP (request for proposal) for us specifically</i>, so we convinced airports that they need this, so it is a huge process to convince them 	Looking for partnerships, joint-ventures
Radical change in competitive	<ol style="list-style-type: none"> 1. <i>Apple changed its mind</i> about allowing us to do that business model, whole business imploded 	Reliance on industry leading company in developing

Critical event	Description of the event	Actions after the event, meaning of the critical event
environment (3)	<ol style="list-style-type: none"> 2. <i>Emergence of international competitor</i>, and failure of the MNC (multinational company), in that sequence. Failure of the MNC not particularly devastating; because [we] developed our B2B platform on devices, our road map had integrated our solution directly to the OS, had preinstalled 200 million devices globally, but <i>MNC decided to let that operations system (OS) go</i> and our strategy went down the toilet 3. <i>EU adopted new directives</i>, all banks must open up services (P2D2 EU directive). That changed a lot the business view of this 	<p>the solution (operating system OS) is risky, aborted the venture</p> <p>New competitor with more resources emerging, aborted or pivoted</p> <p>New regulations opened up the possibilities for business</p>
Start-up ecosystem (5)	<ol style="list-style-type: none"> 1. <i>Relocating</i> to San Francisco 2. <i>Should have moved from my original town sooner</i>, scarce in resources, low paying clients, not that many talents to recruit, not that many innovation ecosystems, it is a smaller hub; maybe less struggle to get sooner away from there 3. <i>Were chosen to be part of an accelerator</i>, they helped us to develop the MVP, won accelerator competition, got first investment (40,000 euros) to launch the app; it is not a lot, but it really helps 4. From the beginning, only me and my co-founder, both coding, were in couple co-working spaces testing it out, breakthrough was <i>getting into an accelerator</i> in Beijing, doing the machine learning; got place in university accelerator, where [there] is <i>free legal advice, free services</i> 5. Started working with start-up organisations, now <i>working with many start-up communities</i> (Startup Grind, WeWork), entry point which got us <i>first kick and boost</i> to get the recognition and get people to believe that we can do something 	<p>Importance of start-up ecosystems</p> <p>Relocate to start-up ecosystem</p> <p>Using start-up ecosystem for support, help to get a boost (e.g., accelerators, incubators, co-working spaces, funding, events)</p>
Team- or Out-sourcing-related (13)	<ol style="list-style-type: none"> 1. Starting in incubator, <i>pitched</i> the project, just me, not having a team yet; <i>buddies of future team members</i> said, 'you should talk to a friend you will like, he's really into this kind of stuff, he loves this', and then it just worked out 2. Changes come from not from customers but from <i>the capabilities of our team</i>; <i>adjust our service based on the capabilities</i> and resources we have at any given moment 3. <i>Critical parts [of] building any app or anything are always people</i>; any business starts with people, after that it's going to be by prototype 4. <i>Biggest thing has been team</i>, because by myself I can't do much, even though I would outsource the things, it wouldn't work 5. Starting this, I already had a lot of contacts and people believed in me so far, finding investors, advisors. <i>Finding my co-founder</i>, already knew him, convincing him to start this was second biggest thing, had initially considered another 	<p>Pitch about your idea in various places, may help to find team members</p> <p>People in the founder team are probably the most critical part, people who can be trusted, share the same goals, and priorities</p>

Critical event	Description of the event	Actions after the event, meaning of the critical event
	<p>co-founder, instead <i>wanted to have someone had trust with and confidence, same goals and priorities</i></p> <p>6. Founder left the company and I joined the company; founder <i>had personal issues</i>, happens in the valley all the time; have been consulting with the company (eight months) prior to that, was smooth transition</p> <p>7. Decided that it was <i>not right decision to outsource the marketing</i>, they we were not agile enough, not for <i>our product market fit finding activities</i>, decided to end cooperation and take it over to ourselves</p> <p>8. Decided to outsource or start to buy software development service for another company, had a one person, company made first version, <i>realised it's risky to have a one-person company to develop critical stuff for us</i>, our software; went with another company, of course, you could have also in-sourced, have a software coder, it's better this way</p> <p>9. <i>Freelancers, tried out a couple, turned out super hard to find good persons</i>, need one person working on a project is quicker than having two to three people; having four you get to the same speed, maybe a little bit quicker, but two to three are usually not as quick as one developer because they have to talk a lot with each other; one developer can just go along, because he knows everything</p> <p>10. <i>Finding right programmers, tried out three</i> before finding one who is actually working and doing a proper job</p> <p>11. Had many critical events because [I] <i>didn't find my CTO</i>, contacted many developers, not very efficient; cancelled the mission, only started once I found my CTO and we developed it well together</p> <p>12. Decision not to launch in the U.S.; <i>banks were not happy, decided to have former banker as the chairman</i></p> <p>13. <i>Paid for our first lawyers because we just didn't know better</i>, charged us by the hour and were most expensive; thought [we] needed them, made good contracts</p>	<p>Finding good developers (or a mix) takes time</p> <p>Have a VIP from the industry in the board</p>
Technology-related (7)	<p>1. People signing up, launched <i>web version</i> of our solution, didn't work out, wasn't good enough, basically the same technique as others; rebuilt it as a mobile app, part was better, nicer, it went off</p> <p>2. Making the <i>decision very early to move into online</i> (1995), going into business for myself, people embracing email marketing, making money, then <i>race to bottom on pricing</i>, that just changed everything; now pricing based on active contacts</p> <p>3. None of us knew how to use React (programming language), then you get our first product (alpha), big step, <i>put an app on a store</i></p> <p>4. Big breakthroughs importing really complex models with textures and various materials, gone from making a scene with</p>	<p>Iteration of suitable technologies and technological architecture</p> <p>Fast changes in digital infrastructure, cost of technology, user habits (web-based vs. mobile apps)</p>

Critical event	Description of the event	Actions after the event, meaning of the critical event
	<p>like six shapes, to making a scene with three hundred thousand shapes, optimisation was always like a very gratifying hurdle to get over, from a user standpoint</p> <p>5. Beginning, had many critical events, <i>website didn't work, couldn't register to the website, and when you have 3,000 to 4,000 users</i></p> <p>6. Something critical happening all the time, <i>system stops working, block of the system stop working, somebody did not get your service ... customers anticipating to get your service and not getting it</i></p> <p>7. <i>This has to be web-based solution (app)</i>, if mobile application won't be scaling, people nowadays don't want to download applications, user cost of download is about \$8 USD, relevant application needs million users</p>	<p>Milestones and critical events of technological development process</p>

5.5 Contextual variables

The contextual variables are related to the circumstances where the process takes place. These variables are the location-related data, the type of industry, and the specific characteristics of the digital context.

5.5.1 Location

The geographical location is one important context in this research. One reason for choosing the different locations of sample start-ups was to attain more generalisable findings. Table 26 in Appendix 8 Tables of detailed findings presents the location-related data in detail. The participants were chosen according to the start-up ecosystem location, as well as the country where the start-up is located (see also Table 4-13 Geographical locations of the interviewed start-ups. The findings of location-based data are divided into the meaning of location, start-up ecosystems, and the China context.

1. Meaning of location

According to the findings, when developing a mobile app, location does not matter, and development can occur in several locations. Table 5-21 Virtual working presents examples of development done in different locations. In the other cases, the location is important (e.g., FinTech industry is a location-specific industry).

2. *Start-up ecosystems*

The start-up, or entrepreneurial, ecosystem ‘focuses on a particular region where entrepreneurs and supporting organisations collaborate to create new start-ups and drive the existing ones’ (Tripathi *et al.*, 2019, p. 64). Start-up ecosystems were discussed in the findings, and how they have been helpful.

The ecosystem helps a lot. The entire atmosphere here is very start-up oriented in Israel (20-TLV).

Yes, very helpful. It is very easy to reach out to people. I’m not sure if it is like that everywhere. Entrepreneurs just seem to be really accessible here (21-TLV).

Beijing ecosystem helps me immensely. That’s a definite yes (28-PEK).

3. *China context*

The context of China is presented separately because China has its own world of internet. The blocking of many Western applications and internet sources (Economy, 2018) is called the Great Firewall of China (Marczak *et al.*, 2015):

Since we are in China, we face specific challenges with the “the Great Firewall” censorship in place. But we still don’t have our own servers here, so actually we are hosting the service in the US West Coast. We are doing certain tricks to be able to not be blocked by the firewall as much (27-PEK).

China has created a system of its own based on Chinese companies’ solutions (Mozur, 2017). The three largest digital companies in China are the BAT companies (Baidu, Alibaba, and Tencent). The China-based BAT companies have a total of 1.08 billion users (Statista, 2018b). WeChat has its own ecosystem (Chan, 2015), and it offers resources for the technological architecture development for the three Chinese start-ups in this research.

5.5.2 **Type of industry**

One of the criteria for choosing the sample for interviews was that they come from different industries. The types of industries in this research were FinTech; education technology (EduTech); marketing and advertising technology (MadTech, AdTech, and MarkTech); logistics and supply chain management technology (LogTech); retail technology (RetailTech) and customer loyalty; AI; big data; software as a service; media, social media, and video game technology (MediaTech); and human relations technology (HRTech). One start-up was in an early stage and could not be categorised (see Table 5-20).

Table 5-20 Type of industry, outcome and technology used

Type of tech		Number of companies	Technology used, outcome
Financial technology	FinTech	5	Web-based solution, mobile app (IOS and Android), blockchain (e.g., Ethereum, bitcoin), digital ecosystem, AI, encryption, application programming interface (APIs), software development kit (SDKs), Ledger Nano
Education technology	EduTech	3	Mobile app, web-based solution, online courses
Marketing and advertising technology	MadTech, AdTech, MarkTech	5	WeChat-based advertising, Jinri Toutiao-based advertising, web-based platform, algorithms, Google Analytics, application integration platform, crowdfunding platform for advertising, email marketing
Logistics and supply chain technology, transportation	LogTech	2	Mobile app, web-based solution, integration platform, bluetooth, encryption, authentication
Retail technology, customer loyalty, feedback	RetailTech	6	Recommendation engine, platform, algorithms, WeChat advertising and retailing, customer engagement solution and platform, QR code and ID
AI, big data, SaaS, cyber security		6	Big data, deep learning, machine learning, digital infrastructure, neuro networks, SaaS, crypto passes, natural language processing (NLP)
Human relations technology	HRTech	2	WhatsApp based solution, algorithm, ICO, mobile app
Media, social media, video, video games	MediaTech	3	Location-based technology, bluetooth, video technology, ray tracing (BRDF)
TOTAL		33*	

* One start-up was in such an early stage that it was not applicable.

5.5.3 Special characteristics of digital context

Specific characteristics of the digital context with regard to the venture creation process included the non-existence of digital assets and the prevalence of virtual working.

1. Virtual working

The digital context enables the ability to work regardless of time and place. Several participating start-up founders and their team work in multiple locations. In addition, the outsourcing of web or mobile app development can be located in other countries (see Table 5-21).

Table 5-21 Virtual working

Theme	Examples
Start-up located in several	London and Japan (04-LON) Hong Kong and Helsinki (24-HKG)

Theme	Examples
simultaneous locations	Beijing and Rwanda (25-PEK) Hong Kong and Beijing (28-HKG) Singapore and Shanghai (30-SHA) Dublin, Paris and Barcelona (33-DUB) Paris and Tel Aviv (34)
Out-sourcing of development to other locations	We have a person in Minsk and two in here. (15-BER) Out-sourced to Pakistan and Brazil (19-LON) Out-sourced to China (32-HKG)

2. Fixed assets talk

Of the 34 interviewed start-ups, 32 did not own fixed (physical) assets. The participants mentioned that they owned their intellectual property rights (IPR), programs, and personal computers; one participant mentioned having servers. Typically, founders try to avoid fixed assets by using cloud, lease, and buying services. The following quotations convey the attitude towards owning physical assets:

‘Nothing like routers or cables, it's a software program totally a software program. We want to keep it that way. We do have certain 'hallway' needs but we are trying to work with other start-up companies that actually can provide that kind of hardware service we might need.’ (27-PEK)

‘Yes, I have my program but that's not a fixed asset. No, no office, it is all internet based.’ (29-SHA)

‘I try to keep it so light so I can get my, you know like, costs low.’ (31-SHA)

5.6 Observation field notes

Table 5-22 presents the findings from the observation field notes. Most interview locations (29) were chosen by the participants. Factors affecting the interview quality included a noisy interview location (6), the participant not being relaxed, interruptions, and the participant being in a hurry (6). The possibility of lying or not telling the whole story was observed in two interviews, as well as possible exaggeration in one interview. A lack of English language proficiency posed problems in the three China-based interviews.

Table 5-22 Field notes of interviews (observation)

	Description	TOTAL	# 01	# 02	# 03	# 04	# 05	# 06	# 07	# 08	# 09	# 10	# 11	# 12	# 13	# 14	# 15	# 16	# 17	# 18	# 19	# 20	# 21	# 22	# 23	# 24	# 25	# 26	# 27	# 28	# 29	# 30	# 31	# 32	# 33	# 34
F2F or internet	Face-to-face interview	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
	Video call	3																												X					X	X
Choice of location	Participant	29	X	X	X	X		X	X	X	X	X	X	X	X		X	X				X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Researcher	5					X									X			X	X	X															
Factors affecting the quality of the interview data	Noisy interview location	6						X										X	X			X	X	X												
	Not relaxed, interruptions, hurried	3																			X													X	X	
	Relaxed, <i>not</i> hurried, enthusiastic	31	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X		
	Lying, hiding truth, not telling	2				X														X																
	Exaggerating	1									X																									
	Issues with English language proficiency	3																										X				X	X			

5.7 Conclusions of chapter

The findings presented in this chapter were categorised during the analysis process and used for creation of the framework of findings in Chapter 6. The findings of Chapter 5 were categorised in five areas: 1) digital venture ideas, 2) antecedents and triggers, 3) venture development process, 4) moderators, and 5) context-related findings. This research has adopted the definition of digital venture idea as ‘a new venture idea that has a digital artefact at the core of the (imagined) market offering’ (von Briel, Recker and Davidsson, 2018, p. 292). The findings related to digital venture ideas were categorised as the initial or the basic idea, the uniqueness of the idea, and the digital technologies on which the ideas are based (Table 5-23).

Table 5-23 Digital venture ideas

Frame-work theme	Findings sub themes	Findings
Digital artefact at core	Basic idea	Digitalisation of financial section, new demand and new services, data-driven ideas, AI-based ideas, algorithm-based ideas, ideas with innovative way of marketing and advertising using digital platforms, EduTech, new digital ecosystem based on blockchain
	Uniqueness of the idea	User-experience based, real-time based, technology-based, personalisation, algorithm-based, AI-based
	Digital technologies used	Blockchain, AI, algorithms, apps, cloud

The findings of antecedents (Table 5-24) are presented as previous experience (i.e., work, studies, networks) and as the trigger (i.e., a critical event, entrepreneurial call, new segment or user group, new technology, and/or the price of the new technology).

Table 5-24 Antecedents and triggers

Frame-work theme	Framework sub themes	Findings
Antecedents	Dynamic capabilities, prior knowledge, social networks (internal), change in competition, technology (external)	Prior knowledge of from industry (relevant work experience), entrepreneurial experience (start-ups), knowledge from the studies of start-ups or digital technology
Triggers	Changes in technology, customer need, entrepreneurial call	New technologies (blockchain, digital platforms, mobile apps, QR codes) Customer need was experienced through people asking for an app or a solution to a problem

Frame- work theme	Framework sub themes	Findings
		Wanting to be an entrepreneur

In addition to the triggers presented in Table 5-24, critical events were experienced as triggers for starting to develop the venture. The dynamic capabilities mentioned in the antecedents are included in the moderator section with the concept of the start-up mind-set (see Section 5.4.3).

The venture creation process includes the phases of *discovery*, *development*, *outcome*, and *diffusion and impact* of the venture idea (Table 5-25). The first-order themes of development phase findings were further coded into second-order themes which included development phase tasks; BM-related tasks (e.g., search for BM, value creation, pivoting, scaling, and growth hacking); technological-architecture-related findings; and the roles of platforms.

Different types of emergent outcomes were categorised as a digital ecosystem, a digital platform, a mobile application, a web-based solution, and cloud computing services (SaaS and PaaS).

Table 5-25 Venture creation process

Phases	Framework sub themes	Findings themes
Discover- ery	New ideas are discovered for potential development into a process, product, or business model innovation Opportunity identification	New technology, new technological solution, personal mission, previous career and experiences, researching the market, personal problem, seeing the gap, seeing industry trends
Develop- ment	<ul style="list-style-type: none"> – Search for value creation, value delivery, and caption (big data, user base as resources) – Product development and testing done with fast prototypes (MVPs), learning from continuous experimentation and real-time usage – Scaling through user base, network effect, framing-adoption cycles – Iteration of digital technologies, building technological architecture by recombining use and design, digital resources of digital infrastructure, less need for physical assets by partnering and cloud computing 	Development actions: <ul style="list-style-type: none"> – Create MVP, prototype – Collect data, evaluate, measure – Exit and strategy – Funding – Outsourcing vs. in-house development – Partnering – Study competitors, markets, product-market fit – User experience

Phases	Framework sub themes	Findings themes
	<ul style="list-style-type: none"> – Digital BMs; iterative BM search, innovative new BMs (platform BM, data-based BM, sharing economy BM) – Initiation (first concrete actions taken to materialise the digital artefact) – Duration (time from venture creation process initiation to outcome) – Opportunity evaluation, development, and exploitation – Idea for core technology is developed into usable innovation – Cloud computing, lower investment costs – Exit strategy developed early 	<ul style="list-style-type: none"> – Users, user needs, testing, feedback, user data <p>Search for BM-related findings:</p> <ul style="list-style-type: none"> – Pivoting – Value creation – Scaling and growth hacking <p>Technological-architecture-related findings:</p> <ul style="list-style-type: none"> – Using one or more types of digital resources and combining them to achieve the emergent outcome – Blockchain and AI-based technologies as sub-themes of technology <p>Role of platforms:</p> <ul style="list-style-type: none"> – Building technological infrastructure – Outcome or platform-based outcome – Platform development (community development and two-sided marketplace development)
Outcome	<p>Sustained offering of a digital artefact</p> <p>Emergent outcome</p> <p>Fluid nature of digital artefacts as outcomes</p>	<p>Different types of emergent outcomes were categorised as a digital ecosystem, a digital platform, a mobile application, a web-based solution, and a software solution (SaaS)</p>
Diffusion and impact	<p>Diffusion: innovation diffuses or spreads across a population of potential users</p> <p>Impact: focus is on the effects digital innovations have on individuals, organisations, markets, and society</p>	<p>Future: generating sales, expanding internationally, raising funding, exit, founding new companies, monetising</p>

The findings categorised under moderators of the venture creation process included macro-, firm-, and micro-level moderators, as well as critical events (Table 5-26).

Table 5-26 Moderators of the digital venture creation process

Frame-work theme	Framework sub themes	Findings
Moderators	Macro-level	<p>Laws and regulations: EU GDPR law</p> <p>External competitive environment: industry leading companies to change policies</p> <p>Technological advancements: FinTech technology and blockchain</p>
	Firm-level	<p>Vision: democratise opportunities</p> <p>Founder- or team-related</p> <p>Building networks (e.g., regulators, governments, start-up communities)</p>

Frame-work theme	Framework sub themes	Findings
	Micro-level	Start-up mindset, entrepreneurial learning
	Critical events	Team- or outsourcing-related, technology-related, funding-related, BM, pivoting-related, start-up ecosystem related, first customer/user-related, radical change in competitive environment, partnering

The nature of the process includes iterative developing and developing without fixed assets, which make the process less bounded (Table 5-27).

Table 5-27 Nature of the process

Framework theme	Framework sub themes	Findings
Nature of the process	Dynamic, iterative, cyclical	Pivoting, iterative way of developing, lean and agile way of developing
	Fluid and less bounded process	Most of the participants did not own fixed assets Varying in-house process and outsourcing the development

Context has an important meaning in this research, first, because ‘entrepreneurial process cannot be abstracted from its contextual setting’ (Moroz and Hindle, 2012) and, second, because the focus of this research is on the digital context and how that changes the entrepreneurial venture creation process.

The findings of contextual variables were categorised as location, type of industry, and special characteristics of the digital context which affect the venture creation process (Table 5-28).

Table 5-28 Context related findings

Framework theme	Findings sub themes	Findings
Contextual setting	Location	Meaning of location, start-up ecosystems, China context
	Type of industry	FinTech, EduTech, LogTech, RetailTech, AI, big data, MediaTech
	Characteristics of digital context	Virtual working (location does not matter) Fixed assets

6 DISCUSSION

This chapter presents the discussion based on the research aim, the research questions, the theoretical framework presented in Section 3.2, and the findings presented in Chapter 5. As mentioned in Section 1.2, the aim of this research is to ‘explore and describe a model of entrepreneurial venture creation process in digital context and to find possible patterns of the process’. The research question formulated from this aim is ‘How do innovative digital technology start-ups conduct the venture creation process with enabling digital platforms?’, with the following sub-questions:

1. How does the digital context affect the entrepreneurial venture creation process?
2. What is the role of platforms in the venture creation process of digital start-ups?
3. What is the nature and what factors are affecting the venture creation process of digital, innovative start-ups?

This chapter describes and presents a new model of innovative digital start-ups and their venture creation process, as well as the patterns found in the process.

This new model is based on literature reviews and an empirical study on entrepreneurial processes (Section 2.2), the digital technology context (Section 2.3), digital innovation (Section 2.5), and new ways to model the digital venture creation process (Section 3.1). The theoretical framework was created and discussed in Section 3.2, and a qualitative multi-method study was conducted on various start-up ecosystems around the world, including in China. Chapter 5 presented the findings of the study.

Based on the theoretical framework and the analysis of the qualitative data, the contribution of a new illustrated model of venture creation process of innovative digital start-ups is presented. Additionally, the nature of the venture creation model is described, and the patterns of the venture creation process are analysed.

This discussion chapter is organised as follows: first, it discusses the venture creation process of an innovative digital venture (Section 6.1); second, it describes the nature and patterns of the venture creation process (Section 6.2); and third, it explains the role of digital platforms in the venture creation process (Section 6.3). The new model is presented through the framework of this study’s findings, including an illustration of the process and

patterns (Section 6.4). Section 6.4.2 discusses the contribution of studying different contexts (i.e., digital technology, geographic, industry, and market contexts). The chapter ends with conclusions (Section 6.6).

6.1 Venture creation process of innovative digital ventures

During the venture creation process, the steps taken by different start-ups vary greatly. None of the interviewed start-ups had the same kind of process, nor did the interviewed founders have the same kind of entrepreneurial journey. Each of the interviewed start-up journeys were unique, as shown by their different process outcomes (see Appendix 9, Appendix 10, Appendix 11, and Appendix 12).

This research uses the terms ‘dimensions’ and ‘phases’ and argues that the entrepreneurship research three phase model of identification, evaluation, and exploitation (Shane and Venkataraman, 2000) (see Section 2.2.3) is incomplete. The dimension of antecedents is presented in earlier models (Ardichvili, Cardozo and Ray, 2003); however, the venture creation process model presented in this research includes all six dimensions of the venture creation process, see

Table 6-1. This is not found in earlier models, and even the latest research does not include the antecedents in their frameworks (Davidsson and Gruenhagen, 2020; Shepherd, Souitaris and Gruber, 2020). The six dimensions are:

1. Antecedents and triggers
2. Identification/discovery phase
3. Development phase
4. Emergent outcome
5. Future of the venture creation process
6. Moderators of the venture creation process

The added themes are the antecedents as a pre-phase of the process; the moderators as external and internal factors modifying the process; the outcome and how it emerges from the process; and the future, which is the phase after the launch when the venture seeks growth.

Table 6-1 Process dimensions in entrepreneurship, digital innovation, and digital entrepreneurship studies

This research	Entrepreneurship	Digital innovation (Fichman, Dos Santos and Zheng, 2014)	Digital entrepreneurship (von Briel, Recker and Davidsson, 2018)
Digital venture idea	New venture ideas (Davidsson, 2015)		Digital venture idea
Antecedents and triggers	Antecedents and Triggers (Ardichvili, Cardozo and Ray, 2003; Foss and Saebi, 2016)	Antecedents and Triggers	
Identification/Discovery (phase)	Opportunity identification, discovery, creation, recognition (Ardichvili, Cardozo and Ray, 2003; Alvarez, Barney and Anderson, 2013)	Discovery	Prospecting (Zaheer, Breyer and Dumay, 2019)
Development (phase)	Opportunity evaluation, development, and exploitation (Shane and Venkataraman, 2000)	Development	Initiation (first concrete actions taken to materialise the digital artefact)
			Duration (time from venture creation process initiation to outcome)
Outcome	Emergent outcome (Levie and Lichtenstein, 2010)	Digital innovation outcomes (Kohli and Melville, 2018)	Digital process outcome (evolutionary)
Future (phase)	Venture growth (Levie and Lichtenstein, 2010)	Diffusion	Scaling (Huang <i>et al.</i> , 2017; König <i>et al.</i> , 2018) and exit (Picken, 2017; Pisoni and Onetti, 2018)
		Impact	
Moderators	External factors, enablers (Davidsson, 2015; Vogel, 2016), BM moderators (Foss and Saebi, 2016)	External and internal competitive environment (Kohli and Melville, 2018)	

This research is adding to the following theories:

1. research of opportunity identification (Ardichvili, Cardozo and Ray, 2003), a theory which is lacking the digital technology part;
2. a re-conceptualization theory of entrepreneurial opportunities, putting emphasis on the role of external enablers including technology (Davidsson, 2015), a theory lacking the phases of venture development;
3. and a business model innovation theory (Foss and Saebi, 2016) and the role of antecedents (including technology), a theory missing the venture creation process phases.

Regarding the performative view of three temporal orientations (Garud, Gehman and Giuliani, 2018), this research found these three orientations to be a suitable way to pre-

sent the venture creation process. The antecedent circumstances are the trigger that enabled the founder(s) to identify the need or see the problem that needs to be solved (*before*); the development of the venture with various actions, which produced the emergent outcome (*being*); and the future of the launched venture with unforeseen risks (*becoming*). In addition, the process model includes different types of moderators such as critical events.

This research argues that the venture creation process of a digital venture does not follow linear growth stages, as stated in previous entrepreneurial research (Levie and Lichtenstein, 2010; Habermann and Schulte, 2017). Instead, the actions and stages are non-linear, and growth can also be negative, as in the case of pivoting or abortion of the venture. This research argues that the process differs depending on the moderators, industry, digital technologies, and location of the venture creation. Critical events may change the development completely and lead the venture to return to the idea phase, start a new development cycle after pivoting, or abort and start over with a different digital venture idea. Using the three temporal orientations of narrative time (Garud, Gehman and Giuliani, 2018), the new model presents the elements and phases in the relation to the temporal orientations as follows.

1. Before

- Antecedent circumstances and triggers (previous experiences, education, and actions undertaken)
- Identification/discovery of the digital opportunity

2. Being

- Development of the digital venture idea (actions taken to obtain a digital process outcome)
- Definition and evaluation of the feasibility of a digital venture idea, which has the purpose of solving a problem
- Search for different ways to solve the problem
- Development of an emergent process outcome which will be either launched, pivoted, or aborted

3. Becoming

- Future of the process outcome and the venture creation process

The term 'before' used in the original performative view is neither commonly used nor

widely accepted (Garud, Gehman and Giuliani, 2018); thus, it is replaced by the term 'before'. The following section discusses these themes and the reason for their inclusion in the model.

6.1.1 Antecedents and triggers

Before the actual venture creation process begins, certain preconditions are needed; these are the antecedents. Antecedents include work- or study-related experience, previous entrepreneurial experience as founder of an earlier start-up, or work-related experience in a start-up. The trigger which compelled the founder to develop the venture also falls into the category of antecedents.

There is a need to move from looking solely at the process of the venture creation to viewing entrepreneurship as a journey (McMullen and Dimov, 2013). This research also claims that antecedents as a pre-phase are of vital importance in the venture creation model because insight is developed during this phase, in addition to the understanding of the industry and changes in the environment, technology, competition, and start-up landscape. Furthermore, this insight, which includes digital technology understanding, is key to the process of discovering and prospecting business opportunities in a digital context. According to this research, the process starts when previous experiences, a trigger, and new digital technology converge and a new digital venture idea is born. Alternatively, something may have been learned from previous work experiences, which could not be carried out within that organisation, so the founder(s) decided to create a new venture for that idea (opportunity).

Previous experiences of this start-up's founders included computer science and financial sector studies, and their original, digital venture idea arose from previous experiences, triggers, and critical events (Table 5-3; Appendix 8, Table 4). From earlier studies, the experience comes from digital technology or information systems side.

The trigger for starting to develop the venture is important. According to the findings of this research, there are many ways to trigger the venture creation process: critical events, customer requests, entrepreneurial calls, new segments or user groups, new technology and the reduced price of new technology, personal experience, and timing and trends.

The trigger may originate from a critical event (Appendix 8 Tables of detailed findings, Table 4), as in two cases of interviewed start-ups (e.g., children getting sick, financial tsunami); the motive for finding the solution to the problem carries through the obstacles in the venture creation, and the financial success is not the main driver of the founder. If the trigger comes from previous experiences in the industry, and the founder has identified that there could be a better solution to the customer problem(s), the founder will be motivated to develop the solution and may attempt to find business possibilities in other use cases or other industries (as seen in two cases in this study).

This research supports the idea of external enablers acting as triggers for opportunity development, for example when technology and regulatory rule changes are interdependent (Davidsson, 2015, p. 684). The trigger can arise from innovative technology which enables something new or something which serves people who have not had access to the technology before. Additionally, the trigger can be a change in regulations or digital technology (e.g., blockchain or access to digital financial data), as in the case of two of the FinTech start-ups in this research. The idea of external enablers being temporary triggers (Davidsson, 2015, p. 684) is also supported by this research.

A critical event as a trigger may be a catastrophe that makes headline news, as is the case in two participating start-ups (children getting sick and financial tsunami). The idea starts with this event and the consequent will to find a solution using new technologies.

In this research, two founders said the trigger for their venture idea was external, such as from a user request. In other cases, the founder was not an active participant in the original venture idea identification, or the venture was aborted after the interview.

6.1.2 Identification of digital venture ideas

New technology and recombining digital resources are at the core of the venture ideas studied in this research. Ten out of 34 answers (Table 5-4 Opportunity identification) mention new technology as an idea discovery (opportunity identification) theme. This research does not differentiate whether the new digital venture idea (opportunity) is discovered, identified, recognised, or developed (Ardichvili, Cardozo and Ray, 2003). The terms 'discovered' and 'identified' are both used in this research to describe the phase

when a new digital venture idea or opportunity is discovered or identified for further development, in order to solve a customer problem.

Recombining technologies during the development phase of the venture idea was mentioned in 32 of the 34 interviews. A new technology is used to solve a customer problem, which is the basic venture idea. The use of new technologies challenges traditional ventures which do not use the advantages that technology brings. In the long term, innovative technology may create new ways to solve problems and even replace the whole industry. This research emphasises the need for IS capabilities, understanding, and adapting the possibilities that new digital technology offers companies' innovative efforts. Table 6-2 provides examples of digital venture ideas, as well as the technologies used by the ventures of this research.

Table 6-2 Examples of digital venture ideas and technologies used in this research

Customer problem	Venture idea	Technology used
The basic idea is to connect on one side the clusters (categorized by the type of needed help), and the people needing the help, and on the other side, helpers in need of cash.	To be more accessible and reachable and get help from your neighbourhood and reconnect the neighbourhood (17-BER).	Digital platform with algorithms
Problem of opening locks with keys.	We can generate simple, secure and sharable passes through mobile and use the mobile as access for physical systems. We have a great secure way of generating our crypto passes (18-BLR).	Blockchain technology
Instead of changing and collecting information, they can start transferring value and services and sending information.	Start building something with real sharing economy so that people can exchange value without, no matter where you are or who you are (24-HKG).	Blockchain technology, Ethereum based (ETH)
Customer's implementation of neuro network was too slow.	Creating a deployment platform for deploying devices (08-SFO)	Artificial intelligence with machine learning and neural networks
Problem of not knowing what type of additional content (spam) you may get, when filling your bank account, a lottery or anything like this, and getting spam of pornography, or any traffic you don't want to get	Our idea is based on artificial intelligence; we have developed some engine, that can recognise appropriate content inside of the traffic. We have a different approach to firewall. (20-TLV)	AI, big data

Customer problem	Venture idea	Technology used
Problem of people not interested and not wanting advertisements	Rethink and reinvent the way of advertising of the world business model of advertising [Our solution] gives finally power to the audiences, it's a new process for the user because they have finally the possibility to impact and donate for free because there is nothing to pay. And it's also a way for the whole advertising ecosystem to increase the user engagement and attention. (34-PAR).	Algorithms

In this research, with regard to the basic idea of a solution to the customer problem, the founder has a strong reason why they think it is important. When interviewing the founders about their initial idea, one can tell who the creator of the initial idea was because they are passionate when discussing their idea. The passion to solve the (customer) problem and find a solution is a pattern. This pattern is recognised and is referred to in the literature as the purpose, vision, and values of the company, where all these factors interrelate and focus on solving the customer's problem (Zaheer *et al.*, 2018). This study adds to the extant research by claiming that the passion is key for pursuing the solution despite challenges.

6.1.3 Development of digital venture idea

This research uses the phrase 'development of venture idea' (development phase), which includes the phases of initiation (first concrete actions taken to materialise the a digital artefact) and duration (time from venture creation process initiation to outcome) suggested by (von Briel, Recker and Davidsson, 2018, p. 287). This development phase includes actions, a term used in entrepreneurial literature (Levie and Lichtenstein, 2010), performed during the opportunity evaluation, development, and exploitation process.

This finding of the empirical research is in accordance with the dynamic process view, which states that the theory of pre-defined stages is no longer valid (Levie and Lichtenstein, 2010; Blank, 2013). This research supports the organisational lifecycle framework with non-linear lifecycles, where 'the transitions to stages may, in some cases, come only after major disruptions in the business' (Kuratko, Morris and Schindehutte, 2015, p. 7).

As the aim of this research is to build a new model with a holistic view of the digital venture creation process, the actions taken during the development phase are not placed in a

particular sequential order. The development phase actions come from the findings (see Table 5-5). Table 5-6 presents the actions ranked by the number of times they were mentioned. This order was created to determine which actions are mentioned and included most often in the participating start-ups' processes. The findings of this research show that the sequence of actions vary depending on the type of BM and the type of digital process outcome (see Appendix 9, Appendix 10, Appendix 11, and Appendix 12). For example, when the outcome and BM is a platform, the specific actions taken are to build a community or communities and to develop a two-sided (or three-sided community) marketplace.

The actions, found in empirical research, during the development phase are as follows (Table 5-6):

1. Technological architecture (digital technologies, resources, components used, enabling platforms)
2. Testing with users, learning about user needs, and reviewing feedback
3. Preparing for scalability
4. Studying competitors, markets, and product-market fit
5. Searching for ways to create value
6. Looking for funding
7. Creating the MVP or prototype
8. Building a team
9. Collecting, evaluating, and measuring user data
10. Building a two-side marketplace and community (platform development)
11. Partnering
12. Deciding whether to use outsourcing or develop in-house
13. Developing the user experience
14. Benchmarking with successful ventures
15. Testing and innovating with lean and agile methods
16. Building networks
17. Thinking about exit
18. Having a vision or theme (framing-adaption) and ecosystem-level process

The following paragraphs discuss these actions in detail.

1. *Developing technological architecture*

A core action of digital venture creation is the development of the technological architecture. The venture recombines the resources of digital technology in the majority (32/34; see Table 5-8) of participating start-ups. The theory of digital innovation (Henfridsson *et al.*, 2018; Holmström, 2018) refers to this recombination of design and resources, and the findings of this research support this theory by showing recombination to be a vital part of the development process. Start-ups select suitable digital technologies (Teece, 2010) and carry out new combinations of components (Joseph A. Schumpeter, 1934; Yoo, Bolland Jr, *et al.*, 2012). In the context of digital technology, this study claims that recombining suitable digital technologies and digital resources from other digital ecosystem actors is a core task in digital venture development. The recombination of technology, resources, and components vary according to the idea development and BM iteration needs.

The ways digital resources and components are used by participating start-ups also vary according to BM needs, venture idea, and geographical location, as is the case with the WeChat platform, an ecosystem in China (see Table 5-9).

Most start-ups did not own any physical assets because they used digital resources; especially cloud computing services (27/34) have enabled easy scaling with ‘pay-as-you-go’ pricing. In addition, this simplifies iteration because it is possible to iterate with the various components and different technologies. Lean and agile ways of developing include the following four themes: testing with users, user needs; studying markets and product-market fit; collecting, evaluating, and measuring data; and creating an MVP.

2. *Testing with users, learning about user needs, and reviewing feedback*

The themes mentioned most often (25/34) in the development phase were users, user needs, and testing with users. The open innovation theory holds that the source of innovation can come from outside of the company and from users (Bogers, Afuah and Bastian, 2010; Greer and Lei, 2012), and the Lean start-up approach emphasises testing the hypothesis with users and data and thus validating the BM and applying the agile way of developing (Ries, 2011; Blank, 2013; Ghezzi, 2019). The findings of this research support

this, as the solution is developed using automated testing and customer feedback; is developed with customers, it is tested with community or focus groups or in different locations with different stakeholders (Appendix 8 Tables of detailed findings, Table 11).

3. *Preparing for scalability*

During the development phase, the iterative BM search seeks a scalable BM, and this lays the foundation for a scalable outcome and business (Picken, 2017). Moreover, the scalable BM is a key to profitable growth (Nielsen and Lund, 2018). Eleven interviews (11/34) mentioned scalability as something the start-ups were targeting, either by looking for a scalable product-market fit, by having a scalable system in place, or by trying to create scalable solutions. The possibility of scaling with the community was mentioned by start-ups with a platform BM.

This research found that the pattern of laying the foundation for the scalable solution occurs during the development phase, which is also referred to as the transition phase (Picken, 2017). This research backs the claim that scalability needs to be kept in mind during the venture development when iterating with the BM (Picken, 2017; Nielsen and Lund, 2018) to achieve rapid scaling through the network effect.

In the past few years I would say this is the tough, first time to lay down the foundation, because we have to build something very scalable. Thus, the time that we build the foundation is much longer than the other start-ups. But once this foundation is built, the good thing is, the entry barrier is very big. Second thing is to think that we're doing is very unique. So, the entry barrier is high. (HKG- 32)

4. *Studying markets, competitors, and product-market fit*

When looking for a product-market fit, the start-up founders studied markets and competitors' processes and best practices, and conducting a market analysis, either when pivoting or before starting to develop the idea (Appendix 8 Tables of detailed findings, Table 9) was mentioned as a theme. This research supports the idea of quickly finding the product-market fit (Osterwalder and Pigneur, 2010; Ghezzi, 2019), as there is a need for fast development (see Table 5-16); this is also the reason for using lean and agile methods.

The following quotation describes an example of not researching the product-market fit:

And they were purely engineers, they had concepts and they were building things, but they were not checking with the market, whether this was something that was needed (SFO-11).

As a side note to this quote, this particular venture is not active anymore.

5. *Searching for ways to create value*

BMs are a way of explaining how value is created (Zott, Amit and Massa, 2011), and value-creating mechanisms in a digital context differ from those in a non-digital context (Priem, Wenzel and Koch, 2018). The ways to create value found in this research included lowering costs by using digital technology (e.g., streaming services, AI); using real-time data; implementing on-demand services (e.g., verification); one-stop platforms; fast and easy ways to use services, as in a case of bank accounts accessed by mobile phones; earning value by using services enabled by blockchain; and fast service enabled by QR codes giving direct customer feedback (see Table 5-11 in Appendix 8 and Table 13). This research supports the claim that value creation for customers is a core element of the BM (Priem, Wenzel and Koch, 2018) and that the search for the BM is done by continuous iteration.

6. *Looking for funding*

The funding theme is high on the list of the themes, 10 of the 34 start-ups mentioned funding-related tasks in their development process, although the interview protocol did not include questions about funding (see Appendix 3). According to the literature, the pattern of start-ups is to search for a BM first and to look for funding later (König *et al.*, 2018). This view is backed by the following two quotations:

'One thing that I did, I started talking to investors very early. I don't think that was necessarily very useful. Because I was told many times that I was crazy and that it was impossible, and that sort of things, and I found that it's only impossible for them and for the people that they know, have ever seen that before, and I was not an asshole like Steve Jobs and I am more of a nice person, that is not what a leader should be. So, I'm not the typical 50 or 60-year-old white guy, and that's part I didn't realize would play such an impact as it has, but it does. Just working with more with the idea. I think I probably wasted a lot of time in meetings.' (SFO-08)

It is better to have already something to show to the financiers to get them interested.

'2015 when we first had the idea. But it took us about six months to open bank accounts and set up the company and find the first batch of founders.

INTERVIEWER: Have you had your seed round or something?

Oh, this is the problem. Unlike other people which go out and get the money first, we actually produce first before we start thinking about that. We did the reverse. Meaning that we are trying to prove something, we actually just launched it, like, what we want. Actually, you can use it. It's not a prototype anymore.' (HKG-32)

7. *Creating MPV and testing*

An essential part of user testing is to build a mock-up version (MVP), which is ‘the smallest thing you can build that will create the value you’ve promised to you market’ (Croll and Yoskovitz, 2013). The MVP (also called a mock-up version) can be very simple, just about anything (e.g., PowerPoint) that can present the value features to the customer; it does not need to have the functionalities in place (see Example 1).

Example 1: Creating an MVP

The venture has started developing the opportunity by first bootstrapping and with free test version.

... the time back in 2013 I didn't know what is UI [user interface] or UX [user experience]. We didn't have those terms yet. So, I just drew them in a PowerPoint or on the board and then ask my teams, you know, can you do this for me and make it nicer. But basically, it is what I want, from this to that, and from that to this, you take this and it will go to that. So, it was very primitive. (HKG-32)

8. Building a team

The findings mentioned the importance of the founder team and team building (Appendix 8, Table 20). When the founders were asked about what would they do differently if they could start over, team building was one of the topics, as well as putting more effort on finding a good team.

‘But if I would start all over again I would even more effort on finding a good team. I mean it sounds like a cliché because I everyone is saying that how important a team is.’ (05-HEL)

Personally, I think definitely getting teammates sooner is something that I wish I did. (12-SFO)

We should have kicked the third co-founded out earlier. We had struggles to kick him out, because he was our developer and important part of the team. We definitely should have kicked him out earlier, because we lost a lot of time. (15-BER)

Another issue in the creation of the founder team is the challenge of finding a CTO. An example from the findings of this research was that only after finding the CTO did the venture development start (Appendix 8, Table 20).

9. Collecting, evaluating, and measuring data

In the digital world, collecting (user) data is part of the development process. Applications and solutions automatically generate data, which can be used to measure and evaluate whether something is working or not. The features can be tested in real-time by looking at user data, which is a major advantage compared to the tangible world.

10. Building two-sided marketplace and community (platform development)

The findings support the claim that, in addition to developing the two-sided marketplace, developers need to engage in building and managing a community (Van Alstyne, Parker and Choudary, 2016) when developing a platform as an outcome (see Appendix 8, Table 16).

11. Partnering

One part of BM development is finding key partners (Osterwalder and Pigneur, 2010). This is supported by this research, as looking for partners was found to be a way to overcome challenges. The example below is from the FinTech industry, where the venture development process includes developing a payment system (see Example 2).

Example 2: Problems with payments

Pivoting the monetisation model, trial and error:

Then we had like a pivot moment, there was a woman who tried to pay through the platform but she couldn't, apparently could not see the blue case, she didn't see it. But she sent through PayPal, not once but eight times, so we had 800 euros in our account, and then we had to send it back to her. And then we paid on top the whole transaction fees from PayPal, so that was kind of enlightening moment for us. Maybe we don't do payments through platform, maybe it is too complex. Maybe we just connect the people and take the premium fee. Now we only take the premium fee. (BER-17)

12. Developing in-house or out-sourcing

The claim that the venture creation process of a digital venture is less bounded, more evolutionary, and more fluid in nature (Nambisan, 2017; von Briel, Recker and Davidsson, 2018) than a traditional venture is supported by this research. For example, the question of whether to outsource or develop technology in-house is in constant flux (Appendix 8 Tables of detailed findings, Table 7). The question is what technological development is important to keep in-house as a competence of the venture, versus what can be outsourced to save on hiring expenses and the need for additional labour. The development of technology can be outsourced to many geographical locations simultaneously, if needed. In-house development can also be located in multiple places.

13. *Paying attention to user experience*

The user experience can give the venture a competitive advantage, if the user experience development is successful in the development process (see Example 3). The first-time user experience is also important to study in the development process.

Example 3: User experience

People want to use:

‘There had been a similar company, but they didn’t get the product to work. They’ve done similar stuff. So, we were not even the first ones in Sweden doing it. But we were the first ones who actually had something people wanted to use. In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work. Maybe one of them had the technology but the UX (user experience) and someone. We were lucky to release a product people loved and when they do start spreading it to friends and family and back on that you can have the organic growth.’ (STO-02)

14. *Benchmarking with successful ventures*

This research found that one way to search for a viable BM is to benchmark a successful digital venture (see Section 5.3.4). This way of explaining the venture vision came up in several interviews (e.g., being the Amazon of airports or Uber of translation).

15. *Testing and innovating with lean and agile methods*

The findings of entrepreneurial learning (Appendix 8 Tables of detailed findings, Table 19) show that if an iterative, lean and agile way of developing the idea is adopted, with emphasis on testing the product-market fit and user experience, and possibly pivoting the venture to ensure the BM is viable, the venture is less likely to waste time developing something which more likely to succeed.

16. *Building networks*

This research supports the importance of founders’ social capital, as building networks during the venture development has a positive impact on the venture development process (Spiegel *et al.*, 2016). The findings show that networks are important for regulators, industry ecosystem stakeholders, and start-up communities (Appendix 8, Table 20).

17. Thinking about exit

This research backs the claim that start-ups ‘should start planning an exit opportunity from day one’ (Pisoni and Onetti, 2018, p. 32). Exit strategy planning, or future planning, should be included in the development phase as a properly planned exit from an early stage of the start-up process. This may not seem important at the beginning of the venture creation but may be useful when the venture is in the exit phase.

Two interviewees (2/34) spoke about exit, and only one was actively thinking about exit during the venture development process (Example 4). Thus, this research supports the statements that the ‘exit process should be properly planned’ (Pisoni and Onetti, 2018, p. 32) and that exit is not typically prioritised in the start-up venture development process.

Example 4: Preparing for exit

Planning on how to develop the venture that it would be attractive to buyers:

At some point in time I want to be able to sell this business and I’ve got to get it to a point where it’s generating the kind of annual recurring revenue that is attractive to such a buyer ... (06-SFO)

18. Having a vision or theme (framing-adaption) and ecosystem-level process

The development phase action related to building a digital business ecosystem is the framing-adaption cycle; a holistic framing BM adaption (i.e., content, structure, and partnerships); and framing to create visibility, credibility, and relationships with ecosystem stakeholders (Snihur, Thomas and Burgelman, 2018). This ecosystem-level process action type of framing-adaption cycle creation was found in the two participating start-ups, both of which had a digital business ecosystem as an outcome. This research supports the claim that when building an ecosystem-level outcome, development needs to be on the system level, not the company level (Palmié *et al.*, 2019).

In the findings, the concept of BM was seldom used, and four actions were categorised under the theme of searching for a BM (Section 5.3.4): pivoting, searching for ways to create value, scaling and growth hacking, and benchmarking from successful ventures. This research backs the claims that venture developers search for a viable BM by iteration and innovation from early on in the process (Blank and Dorf, 2012; Van Alstyne, Parker and

Choudary, 2016; Täuscher and Laudien, 2018) and that the BM can change rapidly during these development cycles (Spiegel *et al.*, 2016).

6.1.4 Emergent digital process outcomes

The concept of an emergent outcome (Lichtenstein, 2015) is adopted by this research because it describes how the digital venture idea is developed and how the outcome emerges from this development and cannot always be determined beforehand. This research examines digital ventures with the process outcomes of artefacts and/or platforms at their core. This definition of digital venture creation process outcome is adopted by this research because it is broad enough to cover all the outcomes found in the empirical research.

1. *Problem of definition and categorization*

To categorize the emergent digital process outcomes was challenging because there is not a unified way to do so (see section 4.7.1, Figure 4-2 and Figure 4-3). In the literature, digital innovation process outcome categories include digital products; service innovation; digital process innovation (Kohli and Melville, 2018; Wiesböck and Hess, 2020); and new platforms (Nambisan *et al.*, 2017, p. 224). These studies do not limit their theorising to ‘pure’ digital entrepreneurship. Another problem found in this research is the classification dilemma of World Trade Organization (WTO) digital trade members (Burri, 2020) and the question of how digital outcomes should be categorised as goods or services since ‘the distinction between goods and services increasingly fades, provoking intense discussions on whether these “digital products” fall into either one of these categories’ (Willemyns, 2019, p. 3). International trade agreements such as the General Agreement on Tariffs and Trade (GATT), and the General Agreement on Trade in Services (GATS) attempt to solve this issue, with contradicting results (Willemyns, 2019; Burri, 2020). As shown in Table 6-3, the definitions of digital venture creation process outcomes are evolving, and this area needs further study.

As this research is focusing on ‘pure’ digital entrepreneurship (Nzembayie, 2019), a need to study further about the definitions of the outcomes from the literature. In general, the term ‘product’ is not well-suited to the outcomes of so-called ‘pure digital entrepreneurship’ (Nzembayie, Buckley and Cooney, 2018). However, several founders use the term

‘product’ for their digital outcome. The product is a difficult concept in a digital context because it usually refers to an object with physical qualities, clear boundaries, and stability. The description of ‘the evolutionary and fluid nature of venture creation process outcomes in the context of digital ventures’ (von Briel, Recker and Davidsson, 2018, p. 293) illustrates the difference between tangible and intangible outcomes. The following quotation uses the product concept, but it would be more understandable if digital technology terminology were used instead (*suggested concept in parenthesis*).

‘The engineers build a core product (*app*) initially and when I joined them, I said there is so much product (*many features*) here, it is almost overwhelming. And when the user walks up to the product (*app/solution*) I don’t know if they know what to do.’ (SFO-11)

Table 6-3 Categorisation and definitions of digital process outcomes

Type of digital outcome	Definition	Examples	Remarks	Area of research
Digital products	‘goods or services that are digitized (converted into a binary format), such as software or music, reports, magazines, and books that are digitized and sold via the Internet’ (Hui and Chau, 2002)	Based on GATS: software, e-books, online courses, design templates, downloadable videos (Weber and Burri, 2012)	There is a problem with this categorisation: if software is bought and later updated via cloud services, is it still a digital product, as an example software as a service (SaaS)	International trade law
Digital services	Services that are supplied digitally and rely on internet and data flows (Willemyns, 2019)	<p>Digital infrastructure services (telecommunication and computer services, digital banking services, distribution services, advertising services) based on GATS carrier services, network management services and hosting and IT infrastructure provisioning services, cloud computing (Willemyns, 2019)</p> <p>Digitally enabled services (online lending, online legal, online consulting services) based on GATS, search engines, social networks, internet telephony (Voice over Internet Protocol: VoIP), video-on-demand services, e-payment services, blogs (Willemyns, 2019)</p>	Transmission and content dichotomy problem; how this will be solved? This is only a research suggestion, not a law.	Research based on international trade law practices

Type of digital outcome	Definition	Examples	Remarks	Area of research
Digital products and services	Use of digital technologies for creation of new digital products and services through the addition of integration of digital components (Fichman, Dos Santos and Zheng, 2014; Lyytinen, Yoo and Boland Jr., 2016; Wiesböck and Hess, 2020)	Smartphone, Oura ring, sport watch (iWatch), Nike running shoes with fitness monitoring, content streaming services	Definition does not distinguish between product and service.	Digital innovation
Digital business process innovations	'Innovative use of digital technologies to enhance existing or create new business processes' (Wiesböck and Hess, 2020, p. 78)	Robotic process automation (RPA), chat bots, internet-based contract management, payment services (Wiesböck and Hess, 2020, p. 78)	The difference between a service or a process is like a line in the water, clearer definitions are needed	Digital innovation

The discussion of digital venture outcomes is still in its nascent stages, and there is not a common agreement as to what digital venture creation process outcomes should be called. It is unclear whether they should be called digital products or digital services or if there is a difference between the two. If there is a difference, how is it defined, and how do digital products differ from digital services? Another question is whether digital venture creation process outcomes require another concept altogether.

The interviewed start-up founders found it hard, if not impossible to categorize the type of their innovation by the categories of process, product or service (see Appendix 3). For that reason, this part of the findings of the background information, Sheet A, was left out.

This research uses the terms 'mobile software application', 'web-based software solution', 'digital platform', and 'digital ecosystem' to describe and distinguish the process outcome types. The business concept of an application or solution suits the needs of this research. It includes the editability of digital technology (i.e., updates, adding, or deleting features), and the application or solution can still be in a state of constant flux after launch.

Other concepts to use in the discussion of emergent outcomes could have been classifying the outcomes into digital artefacts and digital platforms. The problem with this categorisation is that the term 'artefact' is mainly used in academia, and for that reason, it is

not useful in practice. Dividing outcomes on the basis of whether they are an artefact (only) or a platform would not be relevant, as it does not separate the different types of outcomes found in this research.

2. Issue with digital platform and digital ecosystem

This research faced an issue with regard to digital platforms and digital ecosystems, because the two terms are used without being properly defined, and occasionally they are used interchangeably. A suggested solution (de Reuver, Sørensen and Basole, 2018) is to separate the discussion of the technical view from the sociotechnical view (regarding platforms) and to distinguish the organisational view from the technical view (regarding ecosystems).

This study contains two examples of digital business ecosystems as an outcome. To become a digital ecosystem, there needs to be either a core technical platform (which can be supplied by a third party) with a ‘collection of complements (apps) to the core technical platform’, and/or a ‘collection of firms interacting with a contribution to the complements’ (de Reuver, Sørensen and Basole, 2018, p. 127). This study supports this view and classifies the outcome as an ecosystem accordingly. In this research, the outcome (digital business ecosystem) of one start-up includes both the technical and organisational views (see Example 5), and the other start-up’s digital ecosystem takes the organisational view only.

Example 5: Digital business ecosystem as an outcome

A start-up with an outcome as a digital ecosystem (technical and organisational):

‘Basically, we were two founders, it was my CTO and me. I was representing the business vision and he is representing the technical vision. And my vision was to start building something with real sharing economy. So that people can actually exchange value without, no matter where you are or who you are. And my CTO was looking from the technical point of view, and he was interested in the technologies that are enabling sharing economy, namely blockchain. But that is just one of the technologies. So, we combined these visions ... our company is not doing it alone, completely networked society of different start-ups are doing things.’ (HKG-24)

When looking at the blockchain technology example (Example 5), the following elements need to be in place in order to build a digital ecosystem which is both technical and or-

organisational: knowledge of business vision; knowledge of technological vision; new enabling technology (i.e., digital platform, blockchain); the ability to create a digital platform; and the community of other start-ups (or collection of interacting firms). The framing-adoption cycle theory (Snihur, Thomas and Burgelman, 2018) discusses the same elements and is supported. The start-up using blockchain technology is creating a new digital ecosystem, has a vision for the framing, and is attempting to adopt to the needs of the users and partners.

The other example of a digital ecosystem as an outcome in this research is creating the ecosystem one step at a time. First, the company has an idea about a problem to be solved; then, it starts by building an app. After the app, the company creates a digital platform that includes the app and offers other services (e.g., educational services) in line with the original idea. At the same time the company builds up a digital ecosystem by inviting other organizations into the idea to build the community together, ultimately building an ecosystem for the community.

6.1.5 Critical events triggering new development cycles

Moderators are often the reason that the venture development process is dynamic, iterative, and cyclical in nature; they are divided into micro-, firm-, and macro-level (Foss and Saebi, 2016; Zaheer *et al.*, 2018) moderators, and the critical events which occur with these moderators have an impact on the process. One of the few studies interested in looking at critical events (incidents) in entrepreneurial processes using critical incident technique (CIT) adopted the positivist and phenomenological view of the opportunity recognition (Chell, 2015). The CIT study concludes that the CIT technique could provide rich data (thoughts, actions, and feelings) related to critical incidents, which have impacted venture developers' business decisions and personal lives. In addition, the CIT point of view can reveal the shortcomings of the theory being only a theoretical construction, as in a question of 'alertness to opportunity', when 'the actual simulating idea may be otherwise, the event is triggering the identification of the opportunity, such as a felt need, a problem to be solved, a disease cured' (Chell, 2015, p. 221).

This research supports the claim that critical events should be included in the entrepreneurial venture creation process model because critical events may change the process

completely and unexpectedly and cause major disruptions (see Section 6.1.3). In addition, the analysis of critical events may reveal new data which did not surface with the earlier entrepreneurial theory of venture creation process.

This research argues that critical events have a crucial role in the venture creation process of innovative digital start-ups. Critical events may change the venture creation process altogether, and their effect may be negative or positive. A critical event may cause venture abortion or pivoting or lead to a new venture idea being identified. According to the Pareto principle, the 80/20 rule, many of the events taking place are not having a major impact on the process, but some events do have a great impact (Lichtenstein, 2015). This research identified and discussed the critical events the participating start-ups experienced during their venture creation processes (Section 5.4.6).

Critical events can trigger new development cycles of the digital venture creation process or the need to alter something in the outcome of the venture. Figure 6-3 presents an illustration of new development cycles triggered by critical events. The development cycles triggered by critical events form the entrepreneurial journey, which may include several attempts at starting a venture. Of the 34 participating start-ups in this research, 14 founders had between one and 12 previous businesses (14/34). The meaning of these findings is two-fold: first, what the interviewed start-ups considered as a critical event; and second, how the critical event affected the venture creation process. The greatest number of mentions (13) of a critical event stemmed from events related to *the actors* in the venture creation process. Thus, the interviewed start-ups categorised events related to the team members as critical events, such as the difficulty of finding a CTO, capabilities of the team, and constant fluctuation between in-house or outsourced development.

Although the number of participating start-ups (34) is relatively low, some conclusions can be made based the findings of this research. This research argues that the following critical events should be payed attention to due to their effects on the venture creation process (see also Table 5-19):

1. *Actor-related critical events in the venture creation process (team members or outsourcing)*

The people on the founder team are probably the most critical part of the venture creation process. Empirical research show that

- Founder team should include people who can be trusted and share the same goals and priorities
- Having a VIP from the industry on the board is an asset
- Not finding a CTO may harm the chances of financing for digital ventures, or may cause the mission to get cancelled
- The venture development started after the founder found a CTO
- Mistakes in hiring may cause delays in the development process
- Venture had to change developers, not to be dependent on only one person
- Venture were trying out several developers before they found suitable ones

2. *Technology-related critical events*

When searching for suitable technologies to build the emergent outcome, fast changes related to the cost of technology can occur and change the development process. Small technological changes can be meaningful, such as a change in user habits (e.g., regarding web-based versus mobile apps, users do not want to download many apps on their phones); new technologies that offer new possibilities (e.g., AI, blockchain); development platforms making the development process faster (e.g., GitHub); and new types of building blocks or components (e.g., Ledger Nano) emerging.

One start-up had a web-version of the solution, which did not work, they rebuilt a mobile app, launched it and it went off. Some had technological problems such as system stops working, someone did not get company's service, or could not register to the website when having three to four thousand users. There is a need to resolve fast the technological problems or the start-up will lose users and customers.

3. *Importance of the user experience*

The user experience is of major importance in digital venture creation process. If users do not 'love' a company's solution, they will not use it. A critical event of how big a difference the change from web-based solution to a mobile app version made, is an example in this research

4. *Finance-related critical events*

Money is critical, and one cannot go long without it, whether the venture development is backed by bootstrapping, seed funding, or angel investors. When resources are limited, they should be used wisely (lean way of financing), or the venture may be aborted.

5. *Importance of the first customer and partnerships*

Critical events related to customers were the high importance of getting the first customer(s), which gives confidence to go on. In addition, the positive effect of the first customers who are committing resources to the development of the digital venture idea.

Looking for partnerships and joint-ventures for problem solving, case of FinTech and needed license in different countries to operate, giving possibilities for launch.

6. *Unprecedented and radical changes in the competitive environment*

Radical changes in the competitive environment can be risky. New competitors with more resources could emerge; thus, reliance on an industry leading company is not ideal. For example, changes in company policy at Apple and Nokia caused major drawbacks, aborting, or pivoting for the ventures.

Changes in the competitive environment which may offer new digital opportunities can occur when new regulations open up new possibilities for business, as in the case of EU PSD2 open banking regulations (European Banking Federation, 2019).

7. *Business-model-related critical events*

When iterating with the BM, start-up founders found other revenue avenues (e.g., licensing technology abroad), thereby changing direction of the venture from building a technology product to consulting, pivoting; and by changing the revenue model after customers had multiple unsuccessful payment attempts.

8. *Start-up ecosystem related critical events*

The involvement of start-up ecosystems is important due to the support they offer, including access to financing. Relocating to a start-up ecosystem had various effects on participating start-ups, such as having more talent to recruit or being chosen as part of the accelerator, as well as receiving development assistance, free legal advice, free services,

and funding to launch an application. The findings show how critical events may change the course of the venture creation process (see Sections 5.4 and 5.4.6). In Example 6, the whole venture may have to be aborted due to the critical event.

Example 6: Critical events

Story of an unexpected critical event:

‘There are other companies, which I've been through, that there's been other stuff that's happened. Like a similar point was my last company what we were doing something, then Apple changed its mind about allowing us to do that business model, and our whole business imploded. That's a major pivot point for the company. So where do we take company now. Now that Apple has told us that our market is dead. They basically rolled over us and crashed our market. What do we do? And in that situation, we actually fought it initially, which was we had a bunch of customers who were big Apple partners. We said, I'm just a little start up, Apple is not going to pay any attention to me, but you are all big brand names and they do big business with. You are big customers, big partners, you go and argue this for us, because you really want this product, you love this product. Go argue the case for us. And we did have them argue the case for us. Apple still said no.’ (SFO-11)

The critical events found in this research which had either a positive or negative effect were changes in BMs, pivoting, obtaining the first customer, experiencing problems with funding, partnering, creating a prototype, a radical change in the competitive environment, a change in the regulatory environment, relocating and accessing start-up ecosystems, team-related, outsourcing related, and technology-related. The problem with critical events is that the start-up usually does not have power over them, as they happen unexpectedly. Examples of moderators which become critical events include regulatory changes and team- and technology-related issues.

A macro-level moderator, and an example of a critical event, is the changing EU regulatory environment with regard to the GDPR and open banking (PSD2). Both regulations relate to the evolution and use of digital technology in business. In the FinTech industry, open banking (PSD2) regulation creates possibilities for new digital ventures (Guibaud, 2016; Copeland, 2018), and it provided a new business opportunity for two of the participating ventures. The GDPR was discussed in many interviews, specifically how the start-ups have taken time to become compliant to this new regulation. The new regulations also create new industries (e.g., regulation technology [RegTech]; (Buckley *et al.*, 2019).

The long-term founding team is a key success factor when, for example, overcoming the bootstrapping period, when only existing, usually personal resources are used (savings, computers, garage or home). Successful teams combine technical knowledge and industry expertise (Zaheer *et al.*, 2018). This is supported by this research, as changes in the new venture team, a firm-level moderator, were mentioned nine times as critical events (Appendix 8 Tables of detailed findings, Table 22).

6.1.6 Future

Although this research focuses on the earlier stages of the venture creation process, it is important to include the future phase in the model. In regard to the future phase, certain concepts are essential to consider during the venture development process, namely laying the foundation for scaling and having an exit strategy. This phase of the digital innovation process has other conceptual names, including diffusion and impact (Fichman, Dos Santos and Zheng, 2014); when a new digital innovation spreads and impacts individuals, organisations, markets, and society, it is called the scale-up phase (Pisoni and Onetti, 2018), as the company is expanding in terms of market access and revenues, added value, and number of employees. These theories are supported, and a holistic model of the venture creation process needs to include these concepts.

The future phase encompasses how the venture, once the outcome has emerged, can grow, raise funding, and deal with uncertainty and risks, as well as what to do if the venture is not viable. Scaling and growth hacking are strategies for growth. Uncertainty and risks can have both negative and positive consequences, and the future phase may include the possibility of aborting or pivoting the venture, or the exit could be successful and the founder could start and develop new companies. A detailed discussion of the future phase follows.

1. Looking for growth (scaling and growth hacking)

Looking for growth in this research came from scaling, growth hacking, and expanding to new markets (B2B, geographic), (Appendix 8, Tables 13 and 15). Growth hacking is a combination of marketing, data analysis, and coding focused exclusively on growth (Zaheer *et al.*, 2018; Bohnsack and Liesner, 2019). The findings show that this growth also requires

funding, and thus, the task of seeking funding is included in the future phase (Appendix 8, Table 15).

2. *Abort and pivot*

The nature of venture creation process is risky, and most new ventures fail; according to the Startup Genome Report, the failure rate could be as high as 90 % (Marmer *et al.*, 2011). In light of that statistic, it is not surprising that three ventures participating in this study were aborted (see Table 5-15). Although it would be interesting to study the reasons and draw conclusions as to why the three non-active ventures aborted their mission, it is outside the scope of this research.

The effect of unexpected critical events (see Example 7) may lead to end the venture creation process, pivoting, or starting a new venture. Referring to the development of their integration platform solution, one founder reported:

[A critical event happened] ... and our strategy went down the toilet.' (23-HEL)

Pivoting refers to changing some elements of the BM, as Lean start-up methodology suggests to fail fast with the original idea, in order to find the product-market fit and a viable BM (Ries, 2011; Pisoni and Onetti, 2018). This is supported by the findings of this research (see Table 5-10). In pivoting, the participants keep something of the venture idea or a final solution (e.g., the technology, basic idea, or customer group), but they start to develop something different.

The disadvantages of pivoting include losing legitimacy and causing problems with attaining financing. According to a study on managing strategy reorientation (i.e., pivoting) (McDonald and Gao, 2019), anticipating, justifying, and communicating changes in the venture to different audiences helps with transitions. The findings of this research agree with this theory and claim that start-ups who have continuous discussions with clients are developing their venture with the clients; thus, the reorientation of the venture is easier to communicate, and the abruptions of the pivoting do not seem as sudden.

3. *Successful exits and serial entrepreneurs*

A venture may end up in an exit that is planned or unplanned. Exits can be planned; for serial entrepreneurs, the goal is to make money with the exit and to found new companies with the acquired funds.

One participating company had a successful exit, and three participating ventures were no longer active (March 2019). The founders of the start-up that had a successful exit stated that the timing was right because of the new technology and the price of the new technology. They had strong previous work and technological experience (i.e., working at Nokia) and helpful networks as a result. The team had a start-up mindset and were able to overcome major setbacks by learning and iterating as they were developing their digital solution.

6.2 **Nature and patterns of venture creation process of digital venture**

As the aim of this research is to describe how the venture creation process of a digital venture unfolds, in addition to building a model of the process phases, it studied the nature of the process. According to the findings of this research (see Appendix 5), the descriptive themes of the nature of the venture creation process of a digital start-up include constant iteration, iterative BM search, entrepreneurial learning, the need for fast development, and the discussion of opportunity confidence.

6.2.1 **Constant iteration and iterative business model search**

The iterative way of developing products and services through trial and error is recognised both in entrepreneurial theories (Alvarez, Barney and Anderson, 2013; Mason and Harvey, 2013) and in new models of digital venture creation theories (Ries, 2011; Blank, 2013; Fagerholm *et al.*, 2017; Nzembayie, Buckley and Cooney, 2018; Standing and Mattsson, 2018). The findings of this research confirm this theory. This research also supports the theory that digital businesses are constantly iterating (Nambisan, 2017; Ghezzi and Cavallo, 2020). They iterate their BMs and seek new ways to develop. An example is Amazon's method of constant experimentation ('Amazon's Bezos says you can't invent without experimenting', 2018).

In the interviews, a common theme of constant iteration was mentioned by one-third of the start-ups (11/34). Founders vividly explained the many ways they were iterating with the features, functionalities, and design of their solution; experimenting and trying to find the product-market fit; and testing with customers. Through trial and error, start-ups gather feedback and use it for development; they develop with customers and get to know the users, use cases, and customer circumstances.

The following quotation explains the constant iteration of the venture creation process.

Yes, the idea is developing along the way. It doesn't develop in one day (SHA-29).

As mentioned in Section 5.3.4, the term 'business model' was not used when founders talked about their venture creation process. The ongoing task of trying to find a viable BM by iteration can be understood through themes in this research such as value creation, looking for scaling, and pivoting. Additionally, the BM may not be viable or scalable, which means the development process needs major changes to the BM (i.e., pivoting) or the venture may be aborted, as discussed in Section 6.1.6.

An example of the importance of a viable BM is provided by a digital venture in this research. One start-up created a high-quality customer solution that was technologically possible to build, but it did not generate enough turnover or profit and thus the venture was aborted. Occasionally, technology-based ideas have trouble creating viable BMs. Even if the technological solution is created, a strong application or solution is built, and there are users for the application, the idea itself is not enough. If monetisation and BM viability are not tested, the start-up venture creation process will end sooner or later.

6.2.2 Entrepreneurial learning and need for fast development

This research supports the idea of entrepreneurial learning gained while creating the start-up, also known as 'learning by doing' (Aldrich and Yang, 2014), as well as learning from 'continuous experimentation enabled by infrastructure architecture, including tasks, technical infrastructure and information artefacts' (Fagerholm *et al.*, 2017).

The themes of entrepreneurial learning are speed, wasted time, and concentration on the things that matter (Table 5-16). The quotations in these themes are saying that if they had known earlier, what they know now, they would have not concentrated on the things

that did not matter. The iterative way of developing, testing and developing with customers, and obtaining user feedback from early on can help with this problem, as discussed in Section 6.2.1.

Because timing is critical, there is a need to develop quickly and with less effort. In addition, the idea needs validation with customers and data to ensure that the BM is viable and scalable (see Section 5.3.4). This is crucial in the early stages of development when it is possible to change things easily, as the Lean start-up model suggests (Blank, 2013).

1. *Need for speed*

An overarching theme of the interviews was the need to develop fast (Table 5-16). This is a continuous pressure that start-up founders in a digital context face. Example 7 explains the required pace of development.

Example 7: Need to develop fast

'A lot of companies have a tendency to overcook their product and by that time to do that, I don't like quotes, the only quotes that I like quoting is from Reid Hoffman the LinkedIn founder, he says. If you are not embarrassed by the first version of your product, you've launched too late. It's such a great quote because it's exactly that. The first version of your product, you have to launch it, but you have to be embarrassed about it. Why? Because you have to be quick.' (LON-04)

Many actions are performed with fast development in mind:

- lean and agile way of development;
- developing a minimum set of features to get tested fast (MVP),
- launching quickly with a focus on the most essential development;
- prioritising;
- removing team members early when they do not match;
- using cloud computing;
- accepting the reality that consumer expectations are set by actors such as Amazon; and having the ability to access things quickly.

Lean and agile way of developing fast are described in the following quotations:

Testing the product, get feedback, and actively seek for people and try to push wherever we can. Get feedback and analyse that, what are the opportunities, what we have, what are the costs of going to a certain direction. Do week sprints, kind of a lean development in certain sentence.

Knowing the things, we know now, we wouldn't have spent as much time on things that in the end didn't matter. So, we for example spent a lot of time say we wanted to increase retention, people coming back to

the app basically, and we did a lot of experiment doing small tweaks. So, you needed to do bigger things, you needed to develop the product so much further. (02-STO)

You have to execute, meaning, you can't just spend months and months iterating with a product that hasn't been launched. You have to launch quickly. You have to iterate as you go and you have to get customers using quickly, quickly. You are constrained by a few things and constrained by the money you raise. You're constrained by the speed of the market. But really, I mean the reason, there's certain product features you think you should do, but it is not until you have the validation of a customer that you know you should do it. Other than having hired some very good people and also fired very quickly the people that we didn't think were. (04-LON)

The time. We have not always been able to keep the time (frame/dead line) needed for the development as we have thought for that project. So that has brought some challenges. (05-HEL)

The following quotation addresses how Amazon sets the expectations of the modern consumer:

I as a modern consumer have these expectations of ability to access things like very very quickly. You can think of like Amazon, with Amazon we can have things in two days, that has set kind of consumer expectations (07-SFO).

Wrong hiring can result in losing time in the development process, as is expressed on this quotation:

We should have kicked the third co-founder out earlier. We had struggles to kick him out, because he was our developer and important part of the team. We definitely should have kicked him out earlier, because we lost a lot of time (15-BER).

Because fast development is necessary, the ways for accessing this goal are unorganized, fast way of developing and only looking for the current way of things

I am trying to make it organized, less quick and dirty, more thinking about the future. It is built on very small conclusions all the time. (20-TLV)

The first mover advantage relates to the window of opportunity, if not making a move when others have not the start-up may have lost the opportunity

The only thing I would have done, is the ICO earlier. We did it as fast as possible from the decision point. But those who were able to do the ICO five months earlier, they raised 10 times more money. Now it remains to be seen, we are basically competing with them with this, but at the same time as we are limited by the financial resources, it makes us also to focus on our deliveries. It remains to be seen, how those companies, who raised hundred million USD are able to, in the early days, make decisions. I am a little bit sceptical on that. Too much money leads into wasted resources. We need to get the product ready, that's critical, that we get the consumer usable product ready in next few months. (24-HKG)

The only thing is when you try to execute tons of different things you have to prioritize. At first my initial idea, two, three years ago, but the problem is, I may do it too slowly, because I didn't get the funding first, whereas people already have done similar things. (32-HKG)

2. *Need for IS capabilities*

Under the theme entrepreneurial learning the need of IS (information systems) capabilities emerged. The need for IS capabilities and digital technology skills was mentioned in many interviews (see Example 8). IS capabilities are needed throughout the digital venture creation process. In the antecedent phase, the founder(s) need IS capabilities to identify digital opportunities; during the development phase of the digital idea (opportunity), IS capabilities are needed, to enable development. The emergent digital process outcome is evaluated and in a constant state of flux and evolution; hence, IS capabilities are again needed (see Example 8).

Example 8: Need for IS capabilities

'It was just before Christmas time I was speaking with one of my start-up entrepreneur friends, and she said she realized that she's actually a technology leader. She's leading a technology company. And it sort of hit me too, because I was like, yeah, that's exactly the case. It's not even what we are talking about, services and all that. In the end we are working with the development, building up mobile, or something else. And then I realized, that I have to be able to lead a technology company. So, I have to have the competencies for that. And that's something that I have been looking for.' (HEL-05)

In this research, the participating founders who had strong industry understanding but lacked digital technology knowledge learned about digital technology before starting their venture creation. In many cases, there were two founders, one with industry experience, and the other (usually the appointed CTO) with technological knowledge and skills. With cases where the founder had a vision of what they wanted to do but lacked the technological know-how, the venture could not move forward until the CTO was found.

6.2.3 Opportunity confidence

A characteristic of the nature of venture creation process is opportunity confidence, which is a term from the actor-external enabler nexus model (Davidsson, 2015). Opportunity confidence refers to when founders take action or not, 'depending on whether they are confident that what they "see" is an opportunity' (Davidsson, 2015, p. 685). In this research, opportunity confidence was evaluated by asking whether the founders ever doubted their idea. All the participants except one answered that they had doubted their

idea. Some said that they doubted constantly and stated that doubt is useful for the development of the idea.

Every day. Every day I am doubting, if this is the right thing to do. But I think through that process of doubting you also get new ideas, you improve your idea. And you need to be super stubborn to think not to doubt because that would set you up for failure. Most intelligent people have that problem of self-doubt, like once you reach a certain level of intelligence you are not only questioning the things around you, you are also questioning yourself and your ideas. At the end of the day if you have doubts you also have the know and motivation, I am sure we are going to make it. (BER-17)

When developing the venture idea, there is uncertainty as to whether the endeavour will succeed. Most start-up founders constantly doubt their idea and whether they will be able to complete the venture development process (Table 5-17). This research supports the importance of the opportunity confidence (Davidsson, 2015) in the venture creation process and adds that doubting the opportunity (or the venture idea) is constant throughout the venture creation process and entrepreneurial journey. Doubt is also a mechanism for the founders to stay alert to the environment and key changes.

Yes. I keep doubting. Every day I'm thinking you know if there is anything wrong, whether I need to tune it. Because the world is changing, evolving every day. So maybe something that was correct yesterday may not be correct tomorrow (PAR-34).

Based on the findings, this research claims that doubting the venture idea is normal and potentially a necessary characteristic of the founder during the venture creation process.

6.3 Role and meaning of platforms in the digital venture creation process

This study argues that platforms have a major role in the venture creation process in a digital context. Platforms may be the outcome of the digital venture creation process; used for marketing purposes (e.g., Facebook, Instagram, Twitter, WeChat, Jinri, and Toutiaou); or offer the digital resources needed to build the technological architecture of the venture (e.g., AWS, WeChat). The whole technological architecture can be built on a digital platform, or the architecture can use components of different digital platforms. Platforms can also be used for authentication and logging in (e.g., Facebook, LinkedIn).

Cloud computing services and their meaning in the venture creation process illustrate the major role of digital platforms. In this research, 27 of the 34 participating start-ups used cloud services to build their venture; thus, platforms offer vital resources for digital venture development. Moreover, development that uses cloud services offered by cloud providing platforms removes the need for a start-up to own fixed assets.

One of the reasons why platforms have become so powerful is that platforms are winning when a venture with a pipeline BM competes with a venture with a platform BM. Instead of managing the features of the product or a service, with platforms 'you are managing the community' (Van Alstyne, 2015; Van Alstyne, Parker and Choudary, 2016). According to the findings of this research, managing the community is central to platform development (see Example 9). Managing the development of the community provides the possibility for the venture to become a platform.

Example 9: Building a community

She advised us to focus on this community because the target audience is quite interested in being part of a community. It's not only about buying and selling and that's all. She said, don't focus so much on this product, focus more on the whole environment around, like focus on the people that are would buy a product. And if you have this whole environment then the products is what you make money with, but people don't like you because you can get money from them. They like you because you show that you are part of this whole system, the whole community. (BER-16)

6.4 Presenting a new model and found patterns

This section presents a new holistic model and the patterns found in the venture creation process of innovative digital start-ups.

6.4.1 New holistic model of venture creation process of innovative digital start-ups

This study argues that a holistic view of the venture creation process is necessary in order to understand what needs to be included in the venture creation process, especially in the early stages. When developing a new venture, the exit strategy, scalability, and risks of depending on one large ecosystem (e.g., Apple or Nokia) are probably not what new start-up founders have in mind when developing their idea, particularly first-time founders and/or technologically oriented founders.

The trigger to identify and to start to develop the digital venture idea may come from various sources such as previous experiences, personal need, or a critical event. The *identification of a digital opportunity* happens when previous experiences and new possibilities of digital technology are combined. This research has defined the *digital venture idea* as an idea with digital artefacts and platforms at its core. The purpose of the digital venture

idea is to develop a solution to a customer problem. The development of the digital venture idea – referred to as the opportunity evaluation, development, and exploitation phase (Shane and Venkataraman, 2000) in the entrepreneurial literature, or the initiation and duration phase in digital entrepreneurship (von Briel, Recker and Davidsson, 2018) – includes actions to move the venture idea towards the digital outcome.

The actions taken during the development of the digital venture idea vary. In the literature review, the detailed models of different BM types and their venture creation processes are discussed, and the models are categorised (Table 3-2). The actions taken depend on the target outcome. For example, if a venture is creating a platform, two actions would be to create a two-sided (or multiple-sided) marketplace and begin to build a community.

The target of the development phase actions is to create a process outcome, and the nature of the development is to iterate and develop quickly. The constant pressure to develop fast leads to another vital way of developing, which is the focus of the development to be put on the things that matter (see Table 5-16).

The *development of the digital venture idea* includes the following actions, ranked by the number of mentions in this study, as opposed to the chronological order of actions taken (see Table 5-6). As stated earlier, the development process of different venture ideas varies, and not all of the following actions are conducted by all ventures.

1. Building technological architecture by using suitable digital technologies, resources, and components with enabling platforms
2. Testing with users (user needs, feedback)
3. Preparing for scalability
4. Studying markets and competitors
5. Searching for ways to create value
6. Looking for funding
7. Creating MVP or prototype
8. Building the team
9. Collecting, evaluating, and measuring data
10. Building a two-sided marketplace and a community (platform as an outcome)
11. Seeking opportunities for partnering
12. Developing by outsourcing and/or in-house

13. Benchmarking from successful digital ventures (e.g., Amazon, Uber)
14. Testing, innovating, and developing with lean and agile methods
15. Building networks
16. Pivoting (shown separately in the model)
17. Developing an exit strategy
18. Developing an ecosystem (ecosystem as an outcome)

For the initial development of the digital venture idea, the process is similar to the Lean start-up model, whereas in the later development cycles, the process is BM-iteration based. A study comparing different ways of planning suitable for early and later stage ventures found a similar pattern (Mansoori and Lackéus, 2019) of Lean start-up methodology being suitable for early-stage ventures.

Starting from the pre-phase, antecedents and triggers preseed the identification of the digital venture idea, which will be developed by actions simultaneously searching for viable business model with constant iteration. This development is moderated by critical events, which trigger new cycles of development of the digital venture idea. With new emergent digital outcomes launched or pivoted, the entrepreneurial journey moves forward. Alternatively, it may be aborted as an end to the journey.

The entrepreneurial journey cannot be explained by a holistic model of detailed sequence of actions of development, or by different stages of development (Levie and Lichtenstein, 2010) because development cycles, critical events as triggers, and the type of the emergent outcome to be developed all have an impact on what the journey will be. For that reason, the design science approach of asking, ‘What actions or interactions are relevant or useful?’ is recommended. The venture development process includes defining the problem and developing solutions to solve the problem, and by trial and error, and iteration of different possible solutions the venture tries to develop a (financially) viable, and scalable BM.

This study states that critical events as moderators of the process are vital to include in the model because critical events that happen in any of the moderator categories (macro-, firm-, and micro-level) have a considerable effect on the venture creation process. In this study, five start-ups were in FinTech, where the moderators as regulations are somewhat

stricter than in other industries (e.g., RetailTech, EduTech), which puts pressure on start-ups but also opens up opportunities.

Three types of venture process outcomes are recognised in the venture development process. The first is to launch the developed digital solution, or the *emergent digital outcome*. The second is to pivot (Ries, 2011), which means to start a new cycle to develop something different, based on an earlier idea which has a viable and scalable BM. The third is to abort the venture.

The types of emergent and evolutionary digital outcomes of the venture creation process are mobile applications (mobile apps, which are downloaded); software solutions (web-based solutions or cloud service software solutions, such as SaaS, PaaS, and aPaaS); digital platforms; and digital ecosystems. A digital platform may be in the form of a mobile software application or a software solution, can be two- or multi-sided, and includes a community that it is serving. Digital ecosystems may include mobile software applications, web-based software solutions, and digital platforms. A digital ecosystem needs other companies or organisations involved in the ecosystem to provide services, knowledge, and value. Ecosystems can also be based on digital technology such as blockchain. An example of the evolutionary nature of the outcome is a start-up which is initially a web-based solution, then a platform, and finally an ecosystem, as is the case in one of the studied start-ups.

After launching the outcome, the future of the venture includes that the early stage start-ups look to scale their venture. An innovative digital start-up seeks for ways to generate sales by expanding internationally or looking for customers in different sectors and industries. The BM is in a continuous flux and is iterated in order to find a more scalable model. Seeking funding is often necessary to achieve growth. With a successful exit, some founders, especially serial entrepreneurs, are able to invest in other start-ups and/or found new start-ups.

The more innovative and newer the digital technology used for the outcome is, the more there is a question of how the new technology will be adopted, or in digital innovation terms, how the diffusion of new technology will occur (Fichman, Dos Santos and Zheng, 2014). The users need to adapt to new technology, services, and solutions before scaling

can take place. An example of the need to adopt new digital technology from the market is blockchain technology (Angelis and da Silva, 2019), and examples of new digital services and solutions are digital signatures and authentication, which have been discussed in the EU for decades (Julià-Barceló and Vinje, 1998; Mason and Bromby, 2012).

The new model is presented in Figure 6-2 and Figure 6-1.

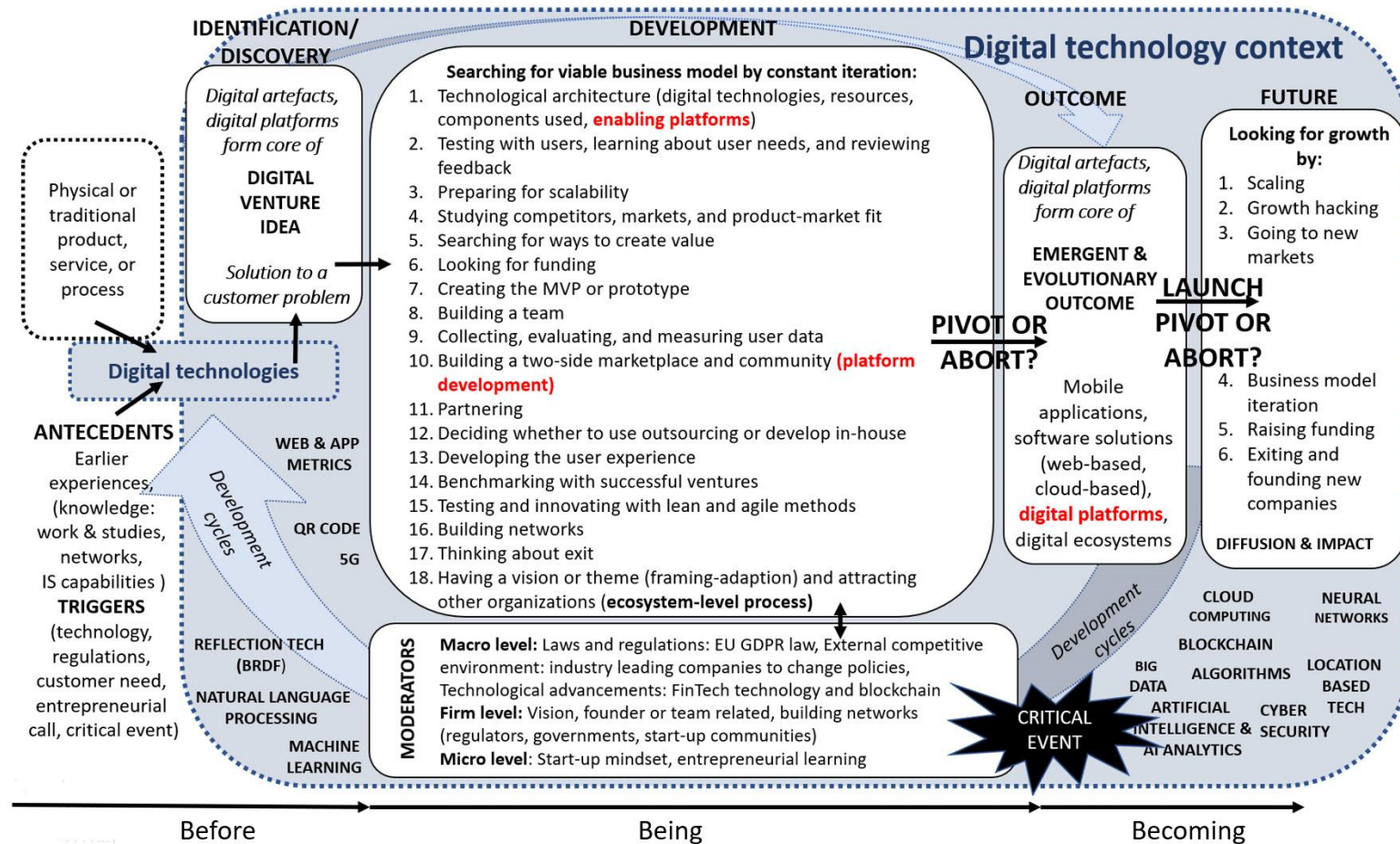


Figure 6-2 Venture creation process of innovative, digital start-ups

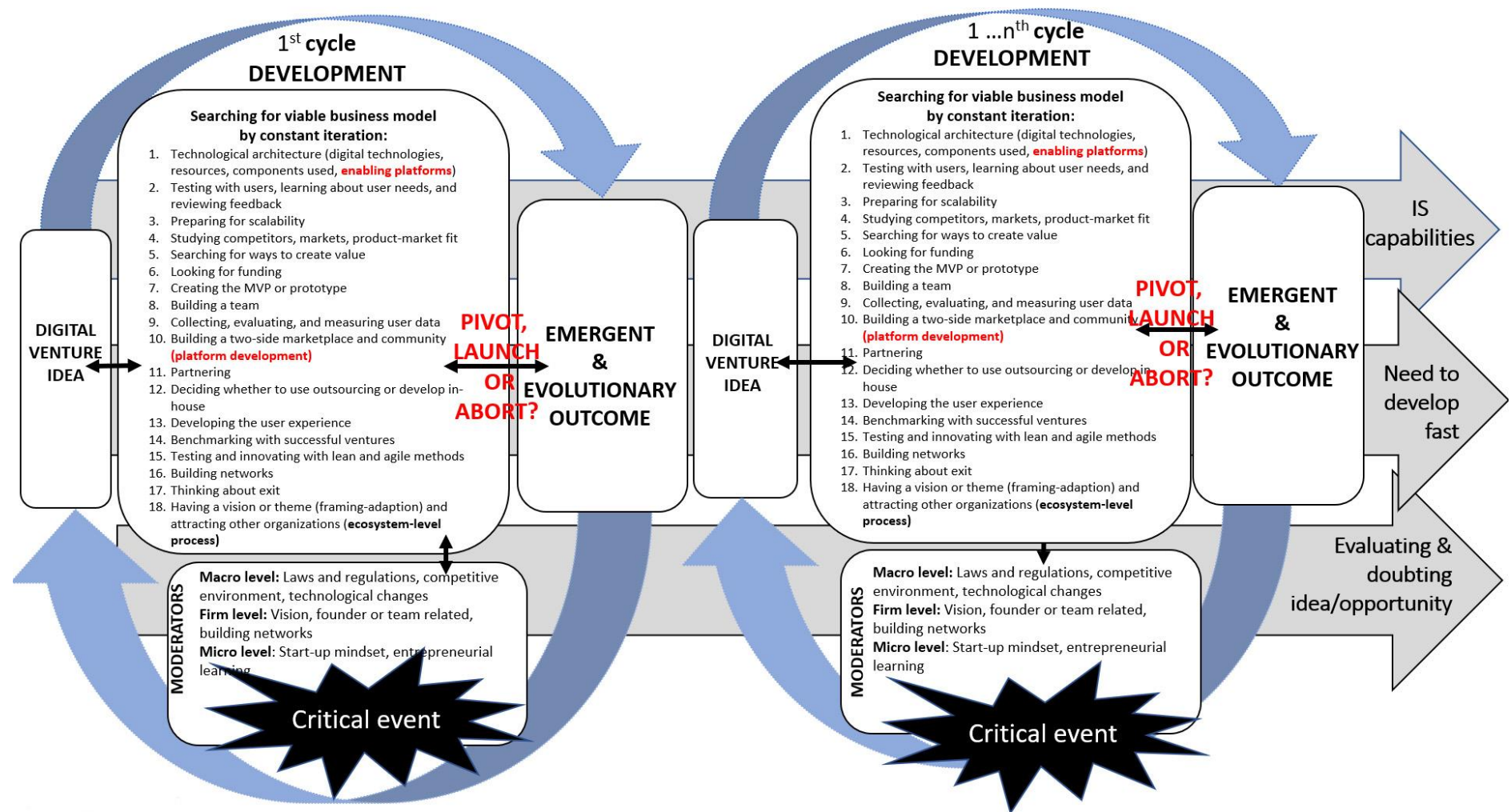


Figure 6-3 Critical events triggering new development cycles (dynamic process)

6.4.2 Comparison of patterns of innovative digital start-ups and traditional businesses

This section discusses the patterns found in this research when comparing the venture creation process of an innovative digital start-up and a traditional business, see Table 6-4.

The need to understand digital technology is a vital capability in the venture creation process of an innovative digital start-up. Teece (2018) acknowledges that dynamic capabilities allow to sense technological possibilities and technology development but does not identify digital technology as a dynamic capability. The ability to understand digital technology (i.e., IS capabilities; (Tan *et al.*, 2015) is needed throughout the venture creation process of a digital venture. As an antecedent, IS capabilities are needed in order to identify the opportunities for digital ventures, and they can act as a trigger for developing a new business. During the venture development phase, IS capabilities are needed to understand how the venture can be developed. Start-ups avoid fixed assets in their development phase to enable freedom for development. Scalability is important and is often discussed at the beginning of the venture development process. Start-ups seek involvement in a start-up ecosystem because these ecosystems offer various services, networks, and funding opportunities

The emergent and evolutionary process outcome – the digital outcome – is not fixed once it is launched; instead, the digital outcome is developed, altered, and may be pivoted during the venture creation process. Furthermore, the digital outcome, once launched, often incorporates updates (versions), new features, and digital components which are added subsequently.

Table 6-4 Comparison of patterns of innovative digital start-ups and traditional businesses

	Pattern	Innovative digital start-up	Traditional business
PRE-STAGE	Antecedents and triggers: need for digital technology understanding (IS capabilities) in addition to the industry or start-up (entrepreneurial) knowledge	During the pre-phase of antecedents, industry insight is born. Industry insight is not enough if digital technology understanding (IS capabilities) is non-existent. A study of the Alibaba MSP platform development (Tan <i>et al.</i> , 2015) shows how IS capabilities are crucial. Especially in early-stage development, IS technical skills and IS infrastructure capabilities are needed. One of the core actions of digital venture development is re-combining technologies and resources. An understanding of both industry and technology is needed to identify business opportunities in a digital context.	Understanding of digital context is not necessary; the trigger comes from the personality traits of the entrepreneur (e.g., gender, previous experience) and the environment (i.e., social, economic, and political infrastructure such as education systems and labour market) (Mazzarol <i>et al.</i> , 1999)
DEVELOPING THE IDEA	Constant iteration	Iteration and experimental development are at the core of the digital venture development process (iteration of BM, technologies, outsourcing or developing in-house, etc.).	Traditional business does not iterate the BM; the development process is more rigid (Nambisan, 2017).
	Seeking growth and scalable solutions with the help of platforms	During the venture development process, the search for a scalable solution and BM is ever present. By laying the foundation for a scalable solution during the development phase, the network effect can help with rapid scaling.	Traditional growth through new locations, personnel, mass production and logistics, or sales levels, profitability, and market share, companies like Standard oil, Sears, GE (Chandler, 1990; McKelvie and Wiklund, 2010).
	Looking for start-up ecosystem involvement	Start-ups seek start-up ecosystem involvement (e.g., having office in incubators, accelerators, or co-working spaces and participating in events). Start-up ecosystem helps with networking and finance.	Traditional business ecosystems are not the same as start-up ecosystems (Jacobides, Cennamo and Gawer, 2018).
	IS capabilities needed when developing the digital venture idea	Understanding digital technology is vital for the development of the venture, to manage something one does not understand is difficult or impossible. Information systems capabilities are needed throughout the process.	Understanding of digital technology is not needed.
	Developing by benchmarking other successful digital ventures and their business models into new contexts	Benchmarking successful digital ventures and their business models, such as platforms (Uber of airports, similar to what Linux was to operating systems and Android was built on top of it, but for blockchain and earning value)	Traditional business has this pattern of benchmarking, but the benchmarking is not done the same way. Traditional business benchmark the BMs of other traditional businesses.

	Pattern	Innovative digital start-up	Traditional business
	Need for fast development	The possibility of using cloud services and setting up a new venture quickly and with low technology cost enables a great deal of competition. The need for fast development of a digital venture is ever present. The first-mover advantage is important (Amazon, Google, etc.). A lean and agile way of developing is related to the need to develop quickly.	The speed is not as important as in the digital ventures, the Resources to invest in the venture development are important (resource-based view of the firm) (Hart, 1995).
	No fixed assets, lower cost of entry (König et al., 2018)	Companies <i>try to avoid having fixed costs by using cloud computing</i> , so that they are free to experiment and iterate their venture and find a viable BM.	Investment/funding needed for starting business (Chandler and Hanks, 1998), high cost of entry.
	Doubting and evaluating the idea (opportunity)	Constant doubt and evaluation of the idea and whether the start-up is able to survive the venture creation process; evaluating the constantly changing environment of digital technology and digital economy (uncertainty).	Traditional business has seen discontinuities, radical industry transformations, and incremental shifts.
	Critical events triggering new development cycles	Critical events trigger new development cycles due to the need for fast development, the importance of the first customer, user experience and the fear of losing customers if the venture does not fulfil customer expectations. Critical events trigger launch, pivoting, or abortion of the venture.	Critical events trigger events, but not all the critical events are the same as in digital business (e.g., CTO importance, start-up ecosystem involvement, outsourcing and in-house development in continuous flux).
OUT-COME	Emergent and evolutionary process outcome (Lichtenstein, 2015; von Briel, Recker and Davidsson, 2018), possibility to change to a scalable idea with low cost, low barriers of changing the BM	Digital ventures are able to change the type of the process outcome relatively easy because of the scalable and on-demand resources cloud computing offers, as well as other building blocks of digital technology.	Traditional types of outcomes cannot change as fast as digital outcomes (manufacturing needs special equipment, ordering of raw material, designing, etc.). There is a fixed outcome, and some features can be changed or altered later (e.g., car, restaurant).

6.5 Different contexts

This research embraces the argument that the ‘entrepreneurial process cannot be abstracted from its contextual setting’ (Moroz and Hindle, 2012, p. 811) and thus discusses the different contexts in this study. The three most important contexts – those of digital technology, geographic, and industry and market – are discussed in detail in the following sections.

6.5.1 Digital context

The framework of this research (see Section 3.2.2) describes how the nature of the entrepreneurial process is different in the digital context. The nature of the entrepreneurial process in the digital context is less bounded and more blurred, than the non-digital venture creation process, and it involves changing industry structures and distributed entrepreneurial agency (Nambisan, 2017; von Briel, Recker and Davidsson, 2018).

This research finds that the digital technology context affects the venture creation process in many ways, including distributed entrepreneurial agency, the dynamic nature of the process with non-linear paths, continuous BM iteration, pivoting, re-configuration of resources and design, and using different digital components and technologies to iteratively create something new. In contrast to thinking that this research was 'only' about investigating the venture creation process in a digital context, this research found that the process is conducted differently in a digital context and that the outcomes of digital ventures are different in nature.

According to the literature, the nature of digital technology is bringing new ways of creating, with little to no need for investments (no fixed assets) and without a large team around the founder. The framework of this research includes the lower cost of entry (König *et al.*, 2018; Nambisan, Siegel and Kenney, 2018) and use of cloud computing to avoid owning physical assets (Parker and Van Alstyne, 2017). The pattern found is that companies prefer to avoid having fixed costs so that they are free to experiment and iterate their venture faster.

INTERVIEWER: Do you own anything? Servers?

INTERVIEWEE: We try not to. We are currently completely based on Amazon; we use Amazon services for that. It's pretty easy to get stuff up and running using this ready-made platform. I do wish it would be a faster process for us, simply because we are both technical people and you know, three months can go like this, you are just talking to people not feeling progress, and once we know what we want to build, it feels like so much progress in a month, when you actually sit down and build stuff (08-SFO).

This has other implications as well, such as the cost and ease of scaling and experimenting with the BM being easier than in tangible businesses. Pay-as-you-go cloud services, resources offered by start-up ecosystems, so-called digital affordances (digital technologies and infrastructures) (Autio *et al.*, 2017), and outsourcing possibilities foster the possibility of experimentation with the BM and the business idea. This claim is also backed by researchers (Zaheer, Breyer and Dumay, 2019, p. 2) who state that digital technologies are

‘not merely a context in studying entrepreneurship’; instead, the digital technology perspective of entrepreneurship should be viewed.

Considering the analogy of the history and development of the transportation infrastructure, not only were roads, harbours, railroads, trams, and airlines developed, but this development brought emerging opportunities that were revolutionary new ways of organising which were not possible prior to the development of the transportation infrastructure. Ideas and knowledge travelled, and the possibility of accessing new markets ‘enabled the specialization of production’ (Garrison, 2003). The new digital infrastructure is creating new opportunities in the same way; this would not have been possible without the digital infrastructure and could not be foreseen.

This new virtual world is developing in a way that no one can predict. The technological advances in AI technology will create new start-ups and new opportunities, such as the nine AI-related technology examples in this research. These participating start-ups use AI technology to search vast amount of data (big data analysis), sort out unwanted data, translate and transcribe several different spoken languages (NLP), create recommendation engines, and use machine learning to optimise neural networks for faster and better performance, for example.

An example of building a new digital ecosystem in this research is an ecosystem based on technology. Blockchain technology enables revolutionary digital opportunities. One start-up in particular was creating a new ecosystem based on blockchain and had visions of a completely new way of creating value and earning value (see Example 10).

Example 10: New revolutionary ideas

We call it Web 3.0. Web 3.0 is when in the internet everyone has a universal identity, so you can be identified. Everyone has a universal wallet, so that I can transfer value to anybody in the world. And then, the third thing is that everybody has a reputation score. And these are the fundamental elements of the new web economy. And that means basically that people actually, instead of changing and collecting information, they can actually start transferring value and services and sending information, because of this trust created by identity, reputation scoring and ability to receive value with the universal wallet. (HKG-24)

The digital technology context shares many universal elements, but the access to internet content is not the same in all geographic locations, as is the case with China and potentially Russia in the future (Matamoros, 2019).

6.5.2 Geographic context

In this research, the geographic context raises two issues: first, the importance of start-up ecosystems in the venture creation process; and second, the digital contexts that vary by geographic location, as in the case of China.

1. *Start-up ecosystems*

The context of start-up ecosystem is important for an early stage digital start-up. A start-up ecosystem can help the start-up in many ways in their venture creation process because it facilitates ‘an experiential knowledge and resource base to support effective organization and scale-up of digital start-ups’ (Autio and Cao, 2019, p. 5432).

In the sample collection process, the participants were chosen from the start-up ecosystems (see Table 4-13), because the pre-understanding was that start-up ecosystems help digital start-ups in their venture development. The pattern found in the empirical research is that start-ups seek start-up ecosystem involvement, either by having their office in incubators, accelerators, or co-working spaces or by participating in events. Additionally, the start-up ecosystem helps with networking and finance.

Digital ventures have distributed entrepreneurial agency (Nambisan, 2017), meaning that the venture creation process can involve different actors, not just the new venture team. For this purpose, start-up ecosystems offer the possibilities of disintermediation (Zaheer, Breyer and Dumay, 2019). This research argues that, in addition to the digital technology context, the start-up ecosystem context is a vital part of the digital venture creation process because start-up ecosystems provide, for example, events, accelerators, co-working and makerspaces, peer-to-peer networks, access to funding, and coaching. All of this creates a favourable environment for venture creation and scaling.

All the start-ups in this research had access to a major start-up ecosystem. Almost half (16/34) of the interviewed start-ups were physically located on the incubator or accelera-

tor premises, and three were in co-working spaces. One reason for the location in accelerators and in co-working spaces is that most of the start-ups selected for the sample were in the early stages and did not need their own office or a great deal of space. In addition, all interviewed start-up founders were involved in start-up ecosystems (e.g., participating in start-up events and giving talks and interviews).

The location is important especially for the early stage start-ups, because start-up ecosystems provide premises, coaching, acknowledgement, and sometimes even funding. Five of the participating start-ups were based in one country but had other locations, as well. Some travelled between two countries, and some had their teams dispersed in different cities.

Digital technology is creating new possibilities for working remotely, as is the case with distributed or remote companies (Agrahri, 2019; Pearce, 2019), as well as with the digital nomad phenomenon (Hart, 2015; Müller, 2016), which holds that one can work independent of location (e.g., in Bali or the countryside) and lead a self-determined life. Other reasons for selecting locations include resources, networks, team members, regulatory climate, and physical closeness to markets. The following quotation emphasises how a digital business can choose its location for solution development, regardless of where it will be launched.

It [London] didn't change anything, that's the beauty about apps, it doesn't matter where you are developing the idea. That's what is going to play a part is when I launch it, and I am launching soon, the market that I am going to pursue. Am I going to pursue London, am I going to invest more to pursue America? Probably, because the bigger market it there. So, it doesn't really matter, where I am living, it's going to matter where I am going to focus my I launch, and my users, not where I am based. (19-LON)

2. *Context of China and internet in China*

The literature on the Chinese internet is technological in nature (Feng and Guo, 2013; Marczak *et al.*, 2015; Economy, 2018); studies social and human capital (Batjargal, 2007); or is political (Griffiths, 2019). One study that investigated the effects of the Great Firewall of China discussed platforms and how censorship causes marketplace disintermediation (Gu, 2019), for example, when Skype was blocked in China and how this affected their business practices. However, the theme of digital entrepreneurship and the internet context in China has generally been overlooked in the Western literature.

Studying the venture creation process within the Chinese internet context, as well as in the context the Western internet, was one of the findings of this study. This finding became apparent during the research and was not in the original plan. As mentioned in the findings regarding digital platforms (Table 5-12) and the China context (Section 5.5.1), China has its own digital giants, and the country restricts access to the internet outside of China. These Chinese ‘unicorns’, digital business ecosystem companies with over one billion USD valuation are Baidu, Alibaba, Tencent, also known as BAT companies, and a new company, LeEco (Greeven and Wei, 2017). The geographical distribution of these unicorn companies in China is concentrated in Beijing, Shanghai, and Guangdong (Goumagias, Whalley and Cunningham, 2019).

In fact, the Chinese WeChat super app (Zhang, 2018) is a platform and an ecosystem with such a wide range of services (including the types of services that Facebook, Snapchat, Amazon, Google, PayPal, and Uber offer) that some Chinese consumers consider WeChat to be the internet (Huang, 2019). The following quotation explains the WeChat ecosystem:

‘Think of WeChat as another version of App Store, you can build your own app embedded in the WeChat system. But it [our solution] is not like a full-grown app, it is more like a Web site, JavaScript based.’ (29-SHA)

This indicates that building technological architecture using cloud computing services offered outside of China is not possible. Instead, this study argues, if one starts building their venture technologically with the Chinese digital platforms and ecosystems or services available in China, they are already in the Chinese markets. For a digital venture that wants to operate in China, it is easier to make the technological architecture of the venture suitable for China from the start, in order to be equipped for the Chinese market and

Example 11:

A start-up and the question of location:

But we are in China, and it's a lot easier for us to go to China than someone, who's coming into China. We have a natural advantage in the fact, that we are in a huge market. We are scaling in the market and this is a huge demand.

Our platform is controlled and tracked by the government [of China]. We are hosted in cloud (AWS China), and using an API server in China. We could have used Tencent or Alibaba cloud services, but they were not as well documented, and was not as well trusted. (PEK-27)

learn how to operate within it. A founder of a China-based start-up in this study made these suggestions for entering the Chinese markets (see Example 11).

Some Western digital companies have managed to launch their service in China with a Chinese version, such as AWS China (Amazon Web Services, Inc., 2019), while other companies have not succeeded. Google launched a censored version of its services in China in 2006, and by 2014 the Chinese government had blocked all Google services, including Gmail, Google Maps, and Google Scholar (Thompson, 2006; Sheehan, 2018). Since then, there has been rumour of a 'secret' Google project to launch a censored search engine for China, but Google terminated the project (Moreno, 2020). Another possibility is an acquisition of a Chinese company operating in the Chinese market, as is the case with Chinese company GoPay, which allows the PayPal payment platform to enter the Chinese market (Perez, 2019).

6.6 Conclusions of chapter

This chapter discussed the conclusions of the findings with references to the literature studied, and presented the contribution of the research. In line with the research aim, this study has explored the venture creation process in the digital context and produced a new model of the process as a contribution to knowledge. This model includes both a sequential illustration and a description of the nature of the process. In addition, the chapter discussed the patterns identified in the process, as well as the contexts of digital technology, geography, and different industries. It also explored the China internet context.

The new, holistic model of the venture creation process of an innovative digital start-up includes the phases prior to the actual venture development: antecedents, triggers, and new venture idea identification. The development phase includes creation of technological architecture (i.e., digital technologies, resources, and components used); user testing; learning about user needs and feedback; studying competitors, markets, and product-market fit; looking for funding; creating the MVP or prototype; collecting, evaluating and measuring data; partnering; deciding whether to use outsourcing or developing in-house; user experience development; and thinking about the exit strategy. The emergent outcome of the development process may be a mobile app, a web-based solution, a digital platform, a digital infrastructure, a digital ecosystem, a software solution (SaaS), or a

combination of these. The future phase seeks the diffusion and impact of the outcome and the new technology by looking for growth (i.e., scaling, growth hacking, entering new markets, BM iteration, and fundraising). In addition, with regard to growth, the future includes the exit and, for serial entrepreneurs, the founding of new ventures.

Table 6-5 compares the theoretical framework presented in Section 3.2 and the new proposed model of venture creation process of early stage, innovative digital start-ups presented in Section 6.4.

Table 6-5 Theoretical framework vs. new proposed model based on findings

Theoretical framework	New model of venture creation process of early stage, innovative digital start-up
Antecedents	Antecedents and triggers: need for digital technology understanding (IS capabilities) in addition to industry and start-up (entrepreneurial) knowledge
Emergent outcome	Emergent, digital process outcomes, different types of applications, solutions, and platforms (mobile app, web-based solution, software solution such as SaaS, digital platform, digital ecosystem)
BM moderators (macro-, firm- and micro-level)	<p>Critical events having a major impact on the process, acting as moderators of the whole process, not only the BM</p> <p>Critical events cause pivoting or abortion of the process</p> <p>Critical events trigger new development cycles</p> <p>Lists types of critical events and the most common ones</p>
	Temporal orientations (before, being, becoming) according to the research philosophy adapted (performativity) (Garud, Gehman, Giuliani, 2018)
	<p>Role of digital platforms in the venture creation process</p> <ul style="list-style-type: none"> • Build technological architecture by using suitable digital technologies, resources, and components • Develop a two-sided marketplace and community or an ecosystem

The venture development process does not happen in isolation; instead, there are enablers and moderators of the process. The moderators (micro-, firm-, and macro-level) are an important building block of the venture creation model because they can lead the venture to be aborted or pivoted. Critical incidents and their meaning to the process are discussed as moderators.

Chapter 7 presents and discusses the conclusions of the research conducted. Furthermore, it provides suggestions for future research in this area.

7 CONCLUSIONS AND FUTURE RESEARCH

This final chapter closes this research with conclusions of innovative digital start-ups and their venture creation process. The conclusions include a discussion of the philosophical views chosen and how they suited this research, the main contributions to theory and practice are presented, and the limitations of this research strategy chosen and how the limitations were minimised. Finally, the suggestions for the future research are presented. The main conclusions of this research are as follows:

The chosen research philosophy was well-suited to the research aim. The research aim was reached by creating and presenting a new model of the venture creation process of innovative digital start-ups, as well as the patterns of the process. The study provides several implications for future research and practice. The transparent research practices used provide the level of quality (reliability, validity, and credibility) required for academic research.

7.1 Philosophical discussion

The interpretivist approach with added performative aspects was suitable for this research (see Table 4-4) because the aim was to explore and describe the venture creation process in the digital technology context and because this research adopted the process view of entrepreneurship (Packard, 2017). When taking the interpretivist philosophical stand, the researcher interprets the findings and the meaning of different approaches to describing the venture creation process of a digital venture with a model and an understanding of the themes which emerged from the data. While the literature refers to the business model concept (Zott, Amit and Massa, 2011; Spiegel *et al.*, 2016; Priem, Wenzel and Koch, 2018), this study found that start-up entrepreneurs rarely use the term ‘business model’; instead, they talk about searching for ways to create value, scaling, and pivoting when describing actions related to the BM, and thus, the researcher had to interpret the theoretical concepts from the findings.

The process view of entrepreneurship as an ongoing journey (beforing, being, and becoming; (Garud, Gehman and Giuliani, 2018) was well-suited to the aim of this research (see Section 6.1). This research replaced the term ‘beforing’ with ‘before’, and it is used to refer to antecedent circumstances, triggers, and the identification of the digital opportunity

(e.g., interview questions of do you have earlier industry/earlier start-up/study experience? And how did you identify the opportunity?). Being explains what development actions the ventures are doing at the moment with regard to development (e.g., how are you developing?), and becoming asks about how the founders envision the future (e.g., what are the next steps?).

In addition, the abductive approach was adopted, and new information and findings came from both the literature and the data. This iterative way of conducting the research enabled the interpretation of the findings with new theories that emerged during the research process, as in the case of an emergent ecosystem-level theory (Snihur, Thomas and Burgelman, 2018).

7.2 Summary of main contributions

This section presents the theoretical contributions to the areas of entrepreneurship, innovation management, and information systems (Section 7.2.1) and suggests implications for practice (Section 7.2.2).

7.2.1 Implications for research and theory

The main contribution of this study is a new, holistic model of the venture creation process of an innovative digital venture (start-up) which illustrates how the nature of the process is moderated by critical events that trigger new development cycles.

This study found that there is a lack of digital-technology-specific research on entrepreneurship (Nambisan, 2017; Sussan and Acs, 2017; Kraus *et al.*, 2018; Standing and Mattsson, 2018). Moreover, information science research needs to engage in finding new conceptual and methodological approaches to studying the digital world (e.g., digital platforms) (de Reuver, Sørensen and Basole, 2018). An example of this need is the lack of a holistic model of the venture creation process, study on the role of digital platforms in the process, and the question of how to define and what are the process outcomes. This study contributes to these gaps by studying digital-technology-specific entrepreneurship and the role of digital platforms in the venture creation process with multi-qualitative methods and by discussing digital process outcomes. Table 7-1 summarises the theoretical contributions of this research, and a detailed discussion follows.

Table 7-1 Summary of theoretical contributions of the study

	Research gap	Contribution
1.	HOLISTIC MODEL OF THE VENTURE CREATION PROCESS OF INNOVATIVE DIGITAL START-UPS	
	<p><i>There is no holistic and unified model of the venture creation process</i> (Moroz and Hindle, 2012), nor is there a unified model for venture creation in a digital context (Kraus <i>et al.</i>, 2018).</p> <p>The exit stage should be included in the process (Pisoni and Onetti, 2018).</p>	<p>This research presents <i>a new holistic model of the innovative digital start-up venture creation process</i>.</p> <p>The process includes the temporal aspects ‘before’ venture development, ‘being’ as developing the venture idea, and ‘becoming’ as the future after the venture development.</p> <p>The proposed model includes the exit phase.</p>
	Entrepreneurial venture creation process models lack <i>digital platforms and their role</i> .	Building on digital innovation theory (Yoo, Boland Jr, <i>et al.</i> , 2012), this research includes digital platforms in the digital venture creation process model. Digital platforms act as an enabling resource for the innovation and development of digital venture idea. The technological architecture of the solution can be built on top of a platform, or platform resources (cloud services) may be the backbone of the technological architecture of the digital venture. The emergent digital outcome could be a digital platform.
	The process outcomes of the digital venture creation process of innovative ventures have not been studied extensively; ‘digital innovation outcomes have received very little attention in the literature’ (Kohli and Melville, 2018, p. 213).	Digital venture creation process outcomes are emergent and evolutionary. Digital artefacts and digital platforms form the core of the digital venture creation process outcomes, and the process outcomes can be categorised as applications (e.g., mobile applications), solutions (e.g., web-based, SaaS), or platforms (e.g., digital platform, digital ecosystem).
2.	CRITICAL EVENTS TRIGGERING NEW DEVELOPMENT CYCLES	
	<p>There is a gap in the research with regard to event-based process research on the digital venture creation process and the impact of critical events (incidents) (Kaulio, 2003; Selden and Fletcher, 2015)</p> <p>Critics of process theory claim the process perspective does not include events related to the entrepreneurial journey in its models (Selden and Fletcher, 2015).</p>	<p>This study builds on the dynamic state approach (Levie and Lichtenstein, 2010) and the Pareto principle (80/20) (Lichtenstein, 2015) that 20% of events have a greater effect than 80% of events. This research studies critical events and their meaning in the venture creation process of innovative digital start-ups.</p> <p>Critical events can have a major impact on the venture creation process of a digital venture by triggering the abortion or pivoting of the venture development process. This research lists critical events, their frequency of occurrence, and the subsequent actions in the innovative digital start-up venture creation process.</p>

1. Holistic model of the entrepreneurial venture creation process in a digital context

The first contribution to the theory of entrepreneurial venture creation is the proposed sequential model for an innovative digital start-up and the venture creation process which includes micro, firm-, and macro-level moderators and critical events. The extant

entrepreneurship theory on venture creation process lacks a holistic, unified model (Moroz and Hindle, 2012), and digital entrepreneurship is still in its nascent stage (Kraus *et al.*, 2018; von Briel, Davidsson and Recker, 2018). Since the termination of the linear stage theory of venture creation and growth (Levie and Lichtenstein, 2010), new approaches to modelling digital venture creation have lacked important elements, such as the exit strategy and exit of the venture (Pisoni and Onetti, 2018) or moderators of the venture creation process which play an important role in the innovative BM search (Foss and Saebi, 2016).

The holistic model presented in this research provided the opportunity to build a research setting which examined the whole process of venture creation, including the antecedents, outcomes, and exit. This research setting did not dig into every detail but collected other types of findings, especially concerning factors such as planning an exit strategy early on in the venture or being able to create different scenarios for routes of action in case an unexpected critical event occurs at the major platform player which the venture is dependent upon. (This happened to one of the participating start-ups in the study.) Due to the complex nature of venture creation, viewing only a limited aspect of the process, such as pivoting, may cause the founder to miss something critical on the journey, for example a result from the sequential events that occur (McMullen and Dimov, 2013).

The claim that digital technologies impact entrepreneurship and management (e.g., innovation management) in a way that requires new theories (Nambisan, 2017; Nambisan *et al.*, 2017) is one contribution of this research to the fields of entrepreneurship, innovation, and information systems. This research found that digital technology profoundly changes the venture creation process, which includes recombination of digital resources, digital platforms, infrastructures, and digital ecosystems, enabling the venture to create a rapidly scalable digital outcome, without owning fixed assets. This research suggests that, due to the nature of digital artefacts (e.g., editable, interactive, re-programmable, combinatorial, and distributable) (Kallinikos, Aaltonen and Marton, 2013), the outcomes of the digital venture creation process should be called applications or software solutions, as in mobile application, digital platform, digital ecosystem, or digital software solutions (Software as a Service), rather than products or services.

Research on digital entrepreneurship and start-ups is ‘sparse and dispersed in different disciplines’ (Steininger, 2018, p. 2), and digital innovation, BM innovation, and start-ups are under-researched areas (Ghezzi and Cavallo, 2020). Most traditional approaches to designing and delivering products and services seem outdated and incapable of addressing the fast-changing digital environment (Leimeister, Österle and Alter, 2014). This research supports this claim and contributes to this gap by studying innovative digital start-ups and their entrepreneurial venture creation process; the main focal points of this research are the digital user or customer, the search of value creation for users or customers, and the development process of a digital venture idea in the digital context.

The contribution of the new venture creation process model presented in this research investigates innovative digital ventures through the framework of the temporal orientations of before, being, and becoming. This is important for three reasons:

1. entrepreneurship researchers call to study entrepreneurial dynamics and express the need for process studies with a view of the entrepreneurial journey that is circumstantial to time and space (McMullen, Dimov 2013, Mason, Harvey 2013);
2. the shift of research in entrepreneurship has turned towards the processes used to form opportunities instead of focusing on the role of the entrepreneur (Alvarez, Barney and Anderson, 2013; Snihur, Reiche and Quintane, 2014); and
3. process studies of opportunities have recognised that the processes used to form opportunities vary systematically (Alvarez, Barney and Anderson, 2013) and that the venture creation process for innovative versus imitative ventures is different (Samuelsson and Davidsson, 2009).

2. Role of digital platforms in venture creation process

The second contribution of this research to entrepreneurship, information systems, and digital entrepreneurship theory is the identification of the vital role and meaning of digital platforms in the venture creation process of digital ventures. In entrepreneurship theory development, a deeper understanding is needed with regard to innovation, platforms, and how they affect the nature and practice of entrepreneurship (Nambisan, Siegel and Kenney, 2018). Digital innovation theories of distributed innovation process based on open innovation theories (Yoo, Boland Jr, *et al.*, 2012) place the focus of digital innovation on the digital platforms.

The conclusions of the literature review (Section 2.6) noted that the role of digital platforms is not discussed in the earlier entrepreneurial literature on the venture creation

process. This research contributes to this gap in venture creation process studies and identifies three roles of digital platforms in the venture creation process:

1. A digital platform is one type of digital venture creation process outcome.
2. Digital platforms offer digital resources and components which are recombined when building the technological architecture of the digital venture (e.g., cloud services, AWS, Google cloud, payment processing), or the whole digital venture can be developed on a digital platform (e.g., WeChat).
3. Digital platforms can be used for marketing purposes (e.g., Facebook, Instagram, Twitter, WeChat, Jinri, Toutiao); and for authentication and logging (e.g., Facebook, LinkedIn).

During the data collection process of this research, a surprising finding emerged, namely the meaning of the Chinese context in the venture creation process. The digital context is divided into two different worlds: China and the rest of the world. This has been noted in the press (e.g., ‘The global internet is splitting into two’ (Chin, 2019) however, discussion of this phenomenon is nearly non-existent in the academic literature. The Chinese digital context is included in this study.

3. Launching, pivoting, or aborting the venture

According to the model proposed by this research (see Figure 6-2), after the development phase, the venture creation process outcome may be launched or pivoted, or the whole venture may be aborted. The different outcomes of the development phase were often caused by a critical event (see Section 6.1.5, Appendix 8, Table 25); for example, a radical change in the competitive environment (platform provider, Apple, changed their mind) resulted in aborting the venture; receiving funding (obtaining the first investors) resulted in a launch; user feedback (web-based or mobile app) resulted in a major pivot; and obtaining the first customer (airport opening RFP) resulted in launching an app.

4. Critical events triggering new development cycles

Critical events acting as triggers for development cycles were found to be key to the dynamics of the processes studied, and including critical events as triggers as a part of the venture creation model is the best way to represent the process. Critical events should be explored as a vital part of the venture creation process of innovative digital ventures and should be included in the models.

The impact of critical events found in this research was as follows:

- They triggered new development cycles

- They may positive (e.g., obtaining funding, or the venture taking off due to a technological change) or negative (e.g. events that cause the venture to pivot or abort)
- Critical events related to the founder team are the most critical part of the venture creation process (e.g., not finding a suitable CTO leads to problems obtaining funding or cancelling the venture, the misfit of members of the venture team causing delays in development)

As critical events receive little attention in the venture creation process research (Kaulio, 2003; Selden and Fletcher, 2015), this research contributes to this gap.

5. *Emergent and evolutionary process outcomes*

This research supports the use of terms other than ‘product’ or ‘service’ to name digital outcomes because the empirical research outcomes could not be categorised using these concepts. The emergent and evolutionary nature of the process outcomes of the digital venture creation process needs to be conveyed by the concepts’ terms. The contribution of this research is to use the terms ‘application’ and ‘solution’ for venture creation process outcomes, as these concepts integrate the nature of digital technology (e.g., editability).

The process outcomes of innovative digital ventures have not been studied extensively (Kohli and Melville, 2018, p. 213). This research includes process outcomes in the new model, and it studied and discussed the categorisation of digital outcomes. The result was to categorise the outcomes as mobile software application, web-based software solution, digital platform, and digital ecosystem. It is questionable whether there be a distinction between products and services, or if these concepts are valid at all when referring to digital outcomes.

7.2.2 **Implications for practice**

The implications for practice of this research can be divided into three areas: 1) the meaning of the holistic view, 2) the meaning of critical events, and 3) the role of digital platforms.

A holistic view of the process helps provide an understanding of what should be considered during the venture creation process, especially in the early stages. When developing a new venture, the exit strategy, scalability, and risks of heavily depending on one large ecosystem (e.g., Apple and Nokia) are most likely not the first things a founder has in

mind. Considering other areas of venture development than technology or the development of the solution may be difficult to understand for a first-time founder or a technologically oriented founder. In this research, entrepreneurial learning shows that if an iterative, lean, and agile way of developing the idea is adopted, with special emphasis on testing the product-market fit, user experience, and the opportunity to pivot and ensure the BM is viable, the venture is less likely to waste time developing something which will not succeed.

In practice, the new model is a useful tool for entrepreneurship education, helping to give students and new entrepreneurs *a holistic view of the whole process in the early stages*, including what they should bear in mind when developing their digital venture. In addition, the implications for practice enable start-up entrepreneurs to check whether they have thought about the different options or included the key areas of consideration presented in this research (e.g., conducting market research, creating MVPs, seeking partners, searching for a viable BM, measuring data, evaluating possibilities for scaling, framing-adoption cycle for ecosystem development) in their planning or iteration phases.

The implication for practice concerning the crucial effects of *critical events* on the venture creation process is to be proactive, either by creating circumstances for critical events to occur or understanding the importance of critical events, such as the meaning and forming of the founding team. Critical events related to the team were mentioned most frequently in this research, and being aware of the importance of the venture team and the significance of problems related to the venture team could help the process. The importance of hiring a suitable CTO early on is one implication. Another implication is to seek occasions to instigate critical events by choice. This means the founders of a digital venture should take part in various events (e.g., in the start-up community) where their venture idea is subject to scrutiny by people from different areas of the start-up ecosystem. This could trigger both positive and negative critical events, help founders to save time by not focusing on things that do not matter, and force new development cycles of the venture development towards more viable outcome, and a business model.

In practice, the significance of platforms is vital to understand when creating a new digital venture. Venture development is possible with limited resources; it can occur in the beginning (bootstrapping) phases without outside funding, by raising funds from family, fools, and friends; using cloud services; and building the technological infrastructure by recombining resources from platforms that offer modules, components, and technologies for third-party developers (e.g., sign-in with Facebook or LinkedIn; Google Maps; payment service providers [PSP]; GitHub).

In addition, platforms are one possible outcome, especially when there is a certain user group or community that needs products or services and others (e.g., consumers, companies) who can offer these, but they need a platform market place to interact.

The third practical implication for digital platforms is that the whole venture can be built on top of a digital platform, as is the case with Chinese WeChat.

For people wanting to create new digital ventures, *both digital technology competences (IS capabilities) and participation in a start-up ecosystem are important*. The founder team may possess different types of industry knowledge, but if no one has a deeper understanding of the digital technology needed, that poses a problem. The understanding and knowledge of digital technology is key for the identification of digital venture possibilities, and being able to manage the venture development process from a technological point-of-view. As one start-up founder said, 'I am managing a technology company'. For an early stage start-up, the enabling support of the start-up ecosystems stakeholders is invaluable, and the start-up mindset is shared with other start-ups. Start-up ecosystems are directed towards helping start-ups with their venture creation process by fostering their development and scaling of digital ventures. This support is an advantage and accelerates entrepreneurial learning.

For education policymakers, *knowledge and understanding of digital technology should be included in the curriculum* of students from a young age. Technology is advancing quickly, and application and solutions are widely used by the younger generations; thus, they should be educated to understand and navigate the digital world. Internet and principles of coding can be taught from early on; for example, Montessori pedagogy notes

that children learn by being curious, includes the concept of certain sensitivity periods being critical for learning, and holds that children have absorbent minds (Lillard, 2013; Clemer, 2018; Montessori Academy, 2020). New books are available, such as *Hello Ruby*, which introduce computers, technology, and programming to kids (Hello Ruby, 2020). This knowledge of digital technology advances the possibilities for new generations to create new digital ventures.

This study emphasises that, for established, incumbent companies to stay relevant, they need to acquire the knowledge and possibilities of digital technologies and have contacts at start-up companies and in start-up communities.

As stated in entrepreneurship theory, the entrepreneurial process should not be abstracted from its contextual setting (Moroz and Hindle, 2012), and hardly any previous studies have been conducted on the entrepreneurial venture creation process in the two internet contexts of the “Western world” and China (Chin, 2019). Therefore, one of the unexpected findings of this research is comes from the digital and geographical contexts studied.

7.3 Limitations

Section 4.4 discussed the study’s limitations including the underpinnings of qualitative and interpretative research, as well as the use of semi-structured, retrospective interviews for data collection. The methods of minimising the limitations (Table 4-8) were reviewed in the data analysis process (see Appendix 5 Audit trail) and put into practice. The following sections outline the methods used to minimise the effects of the limitations, such as minimising research bias with transparency, fact checking the research data using internet sources for accuracy and quality purposes, and validating the data analysis during the pilot interview round.

7.3.1 Assessment of researcher bias

The researcher bias assessment should be conducted early in the research by answering questions such as ‘what is the motivation for this research’, ‘what are the assumptions I am bringing to this research’, and ‘how am I connected to this research (theoretically, experimentally, and emotionally)?’ (Haynes, 2012, p. 78). The motivation for this study is

the researcher's interest in the topic and her current work in the start-up coaching field. The assumptions the researcher brought to this research are discussed in Section 4.9, including that start-up founders are busy, tend to rapidly change their approaches to developing the venture idea, and need to change technological architecture during the venture creation process; another assumption was that team members may change during the development process.

The researcher's theoretical connection to this study comes through reading publications about and following the developments of the start-up world; the experimental connection arises from work experience with student start-up founders; and the emotional connection stems from having participated closely in the ups and downs of the interviewed start-up founders' journeys.

For the transparency in reporting the research process, the audit trail (Appendix 5) and detailed tables of findings (Appendix 8) are provided. In addition, the observation field notes regarding the interview situations are presented (Table 5-22). Furthermore, the discussion of the findings (Chapter 6) provides extensive examples (16) of the identified themes.

7.3.2 Generalizability

Qualitative research is made more generalisable by emphasising its diverse nature, not the number of participants. This research used purposeful sampling to gather data from participating start-up founders of different genders; in various geographical locations and industries; and who use different technologies (see Table 4-13, Table 4-14, and Table 4-15). This research falls short with regard to gender diversity. The sample of 34 interviewed start-ups included 38 persons in total; the gender sample was male dominant, as 30 of the 38 interviewees were male (79 %). Previous studies have shown that male dominance is not a new phenomenon in the start-up world (Dickey, 2019).

In addition, the underpinnings of an interpretive research study can be minimised via transparency of the research and conduct. This can be done by fully describing the design and conduct of the research, as well as by discussing the limitations. The description of the design and conduct of this research was provided by the audit trail (Appendix 5 Audit

trail), the research aim and methodology (Table 4-9), and the limitations and way to minimise the limitations (Section 4.4).

Although the sample was large enough to provide saturated findings for the purpose of this research, and the amount of data generated by the interviews was substantial (244 pages of transcribed data and 1,340 minutes of interview tapes; see Table 4-18 Interview transcription data statistics), the question to consider is what kind of population this research represents. In conclusion, the generalisability of the findings of this research should be limited to the context of this research, and further studies should be conducted to validate the findings in other contexts.

7.3.3 Quality of the research: reliability, validity, and credibility

The assessment of quality of the research includes a discussion on reflexivity in qualitative research settings (Haynes, 2012). This refers to how the researcher affects the research process and outcome. The researcher has prior experience with the start-up venture creation process through coaching student start-up entrepreneurs, and this pre-understanding surely had an impact on the research process. Pre-understanding was gained by having seen a large number of start-ups, visited several start-up events, coached start-up founders, and helped to find start-up event participants who matched the sampling criteria (see Table 4-11).

The transcribed interviews could not be reviewed by the participants due to their busy schedules. To minimise this limitation, the quality and accurateness of the data was fact checked using internet data sources (Table 4-17) for triangulation purposes, although this was not possible for all the start-ups interviewed. An example of the fact checking problems is the start-up with 20 MEUR turnover, the researcher was not able to verify this, the only fact found, was that by 2016 the start-up had 0,5MUSD turnover/profit (Table 4-14). Moreover, the Chinese companies do not have English websites (Table 4-17), and thus, the China context made fact checking impossible for the researcher.

The field notes provide data from the interviews with regard to the researchers' observations and the interview setup (Table 5-22). In the majority of the interviews (31/34), the interviewee was relaxed and enthusiastic. The factors affecting the quality of the interview data included appearing to lie or hide the truth, exaggerating, and having problems

with English proficiency; however, few interviews had these issues (6/34). Each case of the six interviews with English language issues were assessed, whether they had an effect, and reported when necessary (see Table 4-15).

Pre-understanding of Western world internet and start-up culture could have been a bias in China. Due to the different nuances of the China context, the researcher needed to listen carefully and check continuously if the content was understood correctly. Issues with three of the Chinese start-up founders' English proficiency may have affected the quality of the data (Table 5-22). Speaking Mandarin (Chinese) would have been a major asset for the researcher.

The phases of data analysis were categorised in the audit trail through data gathering, data preparation, data analysis, and data presentation (Appendix 5 Audit trail). The audit trail provides the dates, and therefore the sequence of the actions in the data analysis process. The actions described include conducting the interviews, collecting data from internet sources, sequential data of the actions taken (date, actions) and the justification or the reason for analysis and steps taken (including figures of different phases of the process), the full-time line of the whole data gathering process from the first interview round (November 2016) to the conclusions (November 2019), and additional information is given of the actions taken.

The code book displays the final stage of the thematic analysis (Appendix 7 Code book). The code book was automatically generated by NVivo, which verifies the themes used for analysis. It provides the description of each theme, which adds to the transparency of the coding process.

7.3.4 Validation of the data analysis process

The validation of the data analysis process was first executed during the pilot interview phase. Seven pilot interviews were conducted based on the first draft of the semi-structured question sheet. The pilot interviews were conducted to assess the theoretical framework, after which the theoretical framework was redirected towards the digital technology context. The rest of the interviews were conducted using the interview guide,

which included more detailed questions about the technological architecture of the venture creation (see **Error! Reference source not found.**, Question sheet B, questions 6, 7, and 8).

Three conducted interviews were not used for this research because they did not match the sample criteria. One was lacking innovativeness; one turned out to be a physical product; and one was left out because too many of the participating start-ups were already located in Finland.

7.3.5 Retrospective study

Another possible limitation of this research is related to retrospective study. Memory can change and distort what happened (Baron and Ensley, 2006), and this can cause errors (e.g., concerning failure) and bias when the outcome is known (Singh, 2001). To investigate whether this had a significant effect on the data, this research used triangulation; internet data sources for each participating start-up were used to check the interview data (Table 4-17). This was conducted for all the start-ups except for the five Chinese companies (see Table 5-15) because the Chinese webpages were not accessible to the researcher. In general, the information found through triangulation did not lead to any significant findings. The problem with qualitative data and retrospective answers is that the researcher's bias of knowing the outcome of the actions is ever present.

7.4 Future research

This interpretative and explorative research defines a model of the innovative digital start-up venture creation process, but the model does not answer questions about the importance of the different paths of entrepreneurial journey, for example the importance of antecedents, nor how a future start-up founder could benefit from understanding the critical importance of previous experiences. There are interesting examples of the entrepreneurial journeys with a great emphasis on the antecedents of the process, such as the Salesforce CEO/founder's previous experience working for Oracle (Kim, 2015) and receiving crucial early-stage funding from the founders of Oracle.

Another potential area of research derived from the process model presented in this research is the maturity of the process, especially when there are multiple pivots, several

attempts, and changes in the founding team and funding bases. One pivoting study (McDonald and Gao, 2019) claims that pivoting needs a greater emphasis on communicating with clients or users. What other effects does pivoting and changing in the process have on stakeholders? How should the underpinnings of changes in business model be managed, so that the users or customers will not be lost? How does the number of development cycles affect the venture creation process? Do multiple pivoting cycles affect the process, and if so, how?

One area which requires more investigation is the digital outcome, according to the findings of this research. There is a need to refine the types of digital process outcomes and how they are defined and categorised (see Table 6-3). What should the digital outcomes be called, when their nature is so different from physical products and services? Should the digital outcome be given a new name rather than product, service, or process? The distinction between these three terms is difficult, if not impossible.

Another research area of interest is the evolution (development process) of the digital ecosystem as an outcome, as there are many unicorn companies, and the interest towards them is high, this would be of interest to both academia and business. In addition, studying unicorn companies in different internet contexts would be interesting. In both China and the Western world contexts, these companies provide many research setting possibilities. The suggested area of study would cover the process phases of venture creation of a digital ecosystem and how the evolution of the ecosystem was executed. A study with more examples modelling the ecosystem-level process (Snihur, Thomas and Burgelman, 2018) would be of great interest.

A third area of research which addresses a gap in the literature is the internet context of China with its censorship and limited access to foreign applications. A study on how foreign digital companies have successfully entered the Chinese market would be of interest. As China becomes more powerful in the digital world, there is a growing need for cross-border digital services, as in the example of digital payment services (e.g., e-commerce, travel, and overseas education; (Perez, 2019). Future research could study the different methods of entering the Chinese market and how these strategies have succeeded, with an emphasis on the amount of time each method required.

Finally, a subject that is of vital importance to be researched is why start-ups fail. Since the failure rate of start-ups is high, new studies are needed to understand the reasons for start-up failure. Some reasons for aborted ventures in this research were as follows:

- The digital venture idea was not the founder's own idea, or the founder was not acting as CEO from the beginning
- The reason for starting the venture came from users as a non-digital process created in a digital form, but the venture did not have a viable BM
- A venture relied solely on the value of adding features to an existing video solution, but the venture did not have a viable BM
- The venture was only interested in the technological possibilities of a new technology but lacked an interest in creating a viable BM around the possibilities of that particular technology (BRDF)

The research of changing trends of value propositions of start-ups (Van Le and Suh, 2019) is an example of this kind of research studying reasons for failures. The ongoing Covid-19 pandemic will certainly have a major effect on users' needs in the years to come in ways yet to be seen.

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APPENDICES

Appendix 1 Articles of the literature review of digital context

Concepts studied	Author(s)	Area of science (journal)	Nature of the article
digital architecture (layered modular)	(Bhaskar Prasad Rimal, Eunmi Choi and Ian Lumb, 2009; Yoo, Henfridsson and Lyytinen, 2010; Kazan <i>et al.</i> , 2016)		
digital artefacts, digital objects	(Ekbia, 2009; Kallinikos, Aaltonen and Marton, 2013)	MIS, information science and technology	conceptual paper comparison of properties of digital artefacts, archival snapshots and SERP, case study of bugs
digital business strategy	(Bharadwaj, El Sawy et al. 2013)	MIS information systems	
digital economy	(Brynjolfsson 2002, Carlsson 2004, Margherio, Henry et al. 1998, Greenstein, Tucker 2015, Tapscott 1996)		
digital ecosystem	(Weill and Woerner, 2015; Koch and Windsperger, 2017; de Reuver, Sørensen and Basole, 2018; Jacobides, Cennamo and Gawer, 2018)	MIT Sloan management review	
digital entrepreneurial ecosystem, digital infrastructure, digital governance, digital citizenship, multi-sided platforms	(Sussan, Acs 2017)	small business economics	conceptual paper, framework of digital entrepreneurial ecosystem
digitizing, digitization, innovation, theory, management	(Nambisan, 2017; Nambisan <i>et al.</i> , 2017)	entrepreneurship, management information systems	IT and innovation, special issue foreword article (or research commentary?)
digital identity and issues	(Allison, Currall et al. 2005)	information science and technology	

Concepts studied	Author(s)	Area of science (journal)	Nature of the article
digital infrastructures	(Hanseth and Lyytinen, 2010; Tilson, Lyytinen and Sørensen, 2010; Henfridsson and Bygstad, 2013; Constantinides, Henfridsson and Parker, 2018; Rippa and Secundo, 2018)		
digital networks, entrepreneurs' social capital online context, social media, affordances	(Smith, Smith et al. 2017)	entrepreneurship	
digital platforms	(Yoo, Boland Jr, <i>et al.</i> , 2012; Gawer and Cusumano, 2014; Kazan, Tan and Lim, 2014; Evans and Gawer, 2016; Kazan <i>et al.</i> , 2016; Van Alstyne, Parker and Choudary, 2016; Langley and Leyshon, 2017; Constantinides, Henfridsson and Parker, 2018; de Reuver, Sørensen and Basole, 2018)		
digital services	(Williams, Chatterjee et al. 2008)	information systems	
digital technology (characteristics)	(Tilson, Lyytinen and Sørensen, 2010; Yoo, Henfridsson and Lyytinen, 2010; Kallinikos, Aaltonen and Marton, 2013)		
digital transformation (digitization)	(Fitzgerald, Kruschwitz et al. 2014)	MIT Sloan management review	MIT Sloan management review
digitization, digital innovation, organized for innovation in digitized world, product architecture, layered modular architecture, digital technology	(Yoo, Henfridsson and Lyytinen, 2010; Yoo, Boland Jr, <i>et al.</i> , 2012)	organization science, information systems research	research commentary, special issue
shareconomy (sharing economy), definitions, smart cities, digital entrepreneur, digital entrepreneurship	(Richter, Kraus et al. 2015)	entrepreneurship	literature analysis of scientific publications of shareconomy from 2000 to 2014
user innovation, user entrepreneurship, virtual world	(Chandra, Leenders 2012)	<i>Technovation</i>	case study Second Life

Appendix 2 Articles of the literature review of digital innovation

Author(s)	Concepts studied	Nature of the article	
(Yoo, Henfridsson and Lyytinen, 2010; Yoo, Bolland Jr, <i>et al.</i> , 2012)	digital innovation, organized for innovation in digitized world	research commentary, special issue	
(Fichman, Dos Santos <i>et al.</i> 2014)	digital innovation	theoretical, information systems	digital innovation process stages, digital product and business model innovation,
(Kelestyn, Henfridsson 2014)	digital innovation, future shaping everyday practices	information systems	case study (BlaBlaCar, HealthTap, NearPod, Waze), <i>conference proceedings</i> , research-in-progress
(Nylén and Holmström, 2015)	digital innovation strategy	theoretical, business	digital products, digital services, digital processes
(Autio <i>et al.</i> , 2017)	digital innovation		affordances
(Huang, Henfridsson <i>et al.</i> 2017)	digital innovation, digital ventures, user base, rapid scaling	case study (WeCash), longitudinal data	
(Nambisan <i>et al.</i> , 2017; Nambisan, Siegel and Kenney, 2018; Nambisan, Wright and Feldman, 2019)	digitalization of the innovation process, digital innovation, relationship between innovation processes and outcomes	theoretical	
(Henfridsson <i>et al.</i> , 2018)	digital innovation, value spaces framework	cross-Sectional, recombination of value spaces, resources, and connections	redirects the attention from products and services toward digital resources, recombination as design, recombination as use
(Holmström, 2018)	digital innovation, recombination of resources		
(Kohli and Melville, 2018)	digital innovation		

Appendix 3 Interview protocol, questions sheet A and B

Phase	Tasks	References
Opening	1. Thanking for the opportunity for the interview 2. Explaining the purpose of the interview 3. Handing out, explaining, and signing the forms (Informed Consent Form, Participant Information Sheet, Background Information Sheet) 4. Asking the consent for taping the interview	(Galletta, 2013)
Middle	5. Starting with open ended questions creating room for answers 6. Writing down notes to be able to ask more detailed questions later	
Concluding segment	7. Asking questions that can clarify some terms or areas discussed earlier. 8. See that all the topics are covered for the interview 9. Questions that are intending the wrapping up of the interview, and also stating that this is the last question 10. Thanking for the interview at the end.	(Galletta, 2013, pp. 45–53).

SHEET A: BACKGROUND INFORMATION FOR THE INTERVIEW

Questions	Please write your answer here
Name _____	
Name of the start-up _____	
Website _____	
1. Where are you located?	City/town _____ Country _____
2. What is your start-up stage?	Not launched yet <input type="checkbox"/> Already launched <input type="checkbox"/> when? Year _____ Month _____ Not registered yet <input type="checkbox"/> Company registered <input type="checkbox"/>
3. What is the total size of your team? What is the turnover?	
4. Which best describes your role on the team?	Founder <input type="checkbox"/> Other <input type="checkbox"/> What other? _____
5. Is this your first start-up?	Yes <input type="checkbox"/> No <input type="checkbox"/> How many before this? _____

Degree of innovation

Disruptive

Radical

Incremental

Process

Product

Service

Type of Innovation

Please put a cross (X) on the box above to mark your start-up venture.

QUESTIONS SHEET (Interview Guide) B

Questions	Prompt	Rational, reference to theory
Background questions: sheet A		
1. What was the basic image of the business idea/opportunity? What was happening at the time that made the idea possible? What are you putting together with digital possibilities that has not existed before?	external enablers, core idea	external enablers, context (Davidsson 2015) new venture idea, core or basic idea (Davidsson 2015, Cornelissen, Clarke 2010)
2. Do you have prior industry experience in this field? Is this the first idea/opportunity you pursue? Is this your first start-up? How have these experiences affected your current venture? What is your line of expertise?	prior industry experience entrepreneurial experience, serial entrepreneur (PBOE)	New discoveries are path dependent. In this view heterogeneous assets may depend upon past entrepreneurial decisions and these decisions made by founders and future firm entrepreneurial managers may be the DNA composition of the firm. And understanding of how things work. It is the different paths that firms take that account for differential capabilities (Alvarez, Busenitz)
3. How did you identify that this was an interesting opportunity? 4. What was unique and new about the idea? What are you doing differently? What is new? What was the trigger that made you start?	nature of the opportunity/ innovation, opportunity recognition/identification	(Tidd, 2001; Baron, 2006; Baron and Ensley, 2006) the prototypes of experienced entrepreneurs were more clearly defined, richer in content, and more concerned with factors and conditions related to actually starting and running a new venture (e.g., generation of positive cash flow) than the prototypes of novice entrepreneurs
5. How did you start to develop the idea/ opportunity in practice? Did you test or develop the idea/MVP with customers? How? How do you create value to your customers? Have you developed the idea with actors outside of the team (organization)? Who? Has the start-up ecosystem helped with idea development? Why are you located where you are?	opportunity development and exploitation process customer development, minimum viable product value creation distributed entrepreneurial agency	entrepreneurial artefacts (Levie, Lichtenstein 2010, Selden, Fletcher 2015, Venkataraman, Sarasvathy et al. 2012, Schumpeter 1934, Sarasvathy 2003) customer development, pivoting (Blank 2013, Vogel 2016, Ries 2011, Porter, Heppelmann 2014)

Questions	Prompt	Rational, reference to theory
<p>6. What are the (digital) building blocks or parts of the digital ecosystem of your service/product? What is included in the digital infrastructure of your service? Do you have any fixed assets?</p> <p>7. What kind of role have digital platforms played in your idea development? In case you are a platform, what kind of platform?</p> <p>8. What about your users? How do you see your users related to developing your idea? How do you use the data given by users?</p>	<p>digital infrastructure, digital ecosystem virtual servers in Cloud, scalable storage, relational database, migration for databases</p> <p>digital platforms, scaling</p> <p>userbase, network effect, scaling</p> <p>The General Data Protection Regulation (GDPR)</p>	<p>digital building blocks, digital ecosystem, digital infrastructure (Tilson, Lyytinen and Sørensen, 2010; Nambisan, 2017)</p> <p>digital platforms (Parker, Van Alstyne et al. 2016), scaling (Huang, Henfridsson et al. 2017, Nambisan 2018)</p>
<p>9. Could you tell about the critical (key) events that have happened during your development phase? What happened? What kind of modifications /changes did these incidents/triggers force you to make? What happened then?</p> <p>Could you tell something about the critical events? The key events that have happened along with your journey and what did you do afterwards. Some critical events, like milestones, turning points, important events with this developmental journey. Why was this a critical (key) incident/event?</p>	<p>trigger critical incidents</p>	<p>Critical incidents (Chell 2015, Selden, Fletcher 2015, Flanagan 1954)</p>
<p>10. Did you ever doubt your idea? What happened?</p>	<p>opportunity confidence</p>	<p>opportunity confidence (Davidsson 2015, Dimov 2010)</p>
<p>11. Looking back, if you could start from the beginning now, how could you have developed faster your business idea or with less effort?</p>		
<p>12. What are the next steps? How do you see the future?</p>	<p>uncertainty, risk</p>	<p>entrepreneurial uncertainty, genuine uncertainty (Tidd, 2001; McMullen and Shepherd, 2006; Dimov, 2011; McKelvie, Haynie and Gustavsson, 2011; Venkataraman <i>et al.</i>, 2012)</p>

Additional questions concerning the **time** frame, **path dependency** (in technology, business model etc.) and environmental (PESTEL = political, environmental, economical/business, social, technological or legal) **space** have to be included in the critical incidents, whenever the participant is mentioning these incidents.

Appendix 4 Consent forms

CONSENT FORM

Title of Study: **Start-up opportunity development and critical incidents**
Lead researcher: Irma Mäkräinen-Suni

I have been given the Participation Information Sheet and/or had its contents explained to me. Yes ☐ No ☐

I have had an opportunity to ask any questions and I am satisfied with the answers given. Yes ☐ No ☐

I understand I have a right to withdraw from the research at any time and I do not have to provide a reason. Yes ☐ No ☐

I understand that if I withdraw from the research any data included in the results will be removed if that is practicable (I understand that once anonymised data has been collated into other datasets it may not be possible to remove that data). Yes ☐ No ☐

I would like to receive information relating to the results from this study. Yes ☐ No ☐

I wish to receive a copy of this Consent form. Yes ☐ No ☐

I confirm I am willing to be a participant in the above research study. Yes ☐ No ☐

I note the data collected may be retained in an archive and I am happy for my data to be reused as part of future research activities. I note my data will be fully anonymised (if applicable). Yes ☐ No ☐

Participant's Name: _____

Signature: _____ **Date:** _____

This consent form will be stored separately from any data you provide so that your responses remain anonymous.

I confirm I have provided a copy of the Participant Information Sheet approved by the Research Ethics Committee to the participant and fully explained its contents. I have given the participant an opportunity to ask questions, which have been answered.

Researcher's Name: Irma Mäkräinen-Suni

Signature: _____ **Date:** _____

PARTICIPATION INFORMATION SHEET

Start-up opportunity development and critical incidents

Researcher: Irma Mäkäräinen-Suni

Supervisor: Professor Alan Pilkington, Dr. Sergio de Cesare and Dr. Maria Granados

You are being invited to take part in a research study on start-up opportunity development phase and critical incidents. This research is being undertaken as part of the researcher's studies for PhD. studies at the University of Westminster, Westminster Business School (London).

The study will involve you:

- 1) Completing a questionnaire. This questionnaire will collect background information needed for the interview. The background questionnaire will save the time from the interview itself. This will take around 5 minutes to complete.
- 2) Participating in an interview with me either face-to-face or via Skype, which will take from 20 minutes to 1 hour and will be tape-recorded. The recording will be transcribed and the audio recording retained as part of the research archive for a period of 4 years.

Please note:

- Your participation in this research is entirely voluntary and you have the right to withdraw at any time without giving a reason.
- You have the right to ask for your data to be withdrawn from the study as long as this is practical, and for personal information to be destroyed.
- You do not have to answer any particular question either on questionnaires or in interviews if you do not wish to do so.
- Your responses will normally be made anonymous, unless indicated above to the contrary, and will be kept confidential unless you provide explicit consent to do otherwise, for example, the use of your image from photographs and/or video recordings.
- No individuals should be identifiable from any collated data, written report of the research, or any publications arising from it.
- All computer data files will be encrypted and password protected. The researcher will keep files in a secure place and will comply with the requirements of the Data Protection Act.
- All hard copy documents, e.g. consent forms, completed questionnaires, etc. will be kept securely and in a locked cupboard, wherever possible on University premises. Documents may be scanned and stored electronically. This may be done to enable secure transmission of data to the university's secure computer systems.
- The researcher can be contacted during and after participation by email (Irma.makarainen-suni@haaga-helia.fi) or by telephone (+35840 4887379).
- If you have a complaint about this research project you can contact the project supervisor, Professor Alan Pilkington by e-mail (a.pilkington@westminster.ac.uk).

Appendix 5 Audit trail

Empirical part of the research including data gathering (DG), data preparation (DP), data analysis (DA), data presentation (DP)

Date	Actions		Additional information/ notions
Nov 2016 – Feb 2017	Pilot interview round, 7 interviews conducted	DG	Helsinki, Stockholm, London
Nov – Dec 2016	Pilot round interviews manually transcribed by researcher	DP	NVivo transcription style not used yet
Dec 2017	NVivo two-day course, basic level Created the transcription style needed for auto coding in NVivo		University of Surrey
Feb 2018 – March 2019	Main interview round 27 interviews conducted, and observation field notes gathered	DG	San Francisco, Helsinki, London, Stockholm, Berlin, Tel Aviv, Beijing, Shanghai, Hong Kong
Feb 2018 – 18 Nov 2019	Internet sources data collection (webpages, YouTubes, LinkedIn, Twitter, Facebook)	DG	
May 2018	NVivo course (Skype), advanced level, 1 day Will use the case structure in NVivo for each interviewed start-up, even not a case study, first attribute values created, first word count and word cloud created		
June 2018	First interview transcriptions with the proper interview structure implemented, NVivo transcription coding structure in Word, earlier transcriptions corrected for this style	DP	The transcription style of the interviews described in Section 4.7.1. was adapted
Oct - Nov 2018	Transcribing interviews manually, first seven done by researcher, enough experience and knowledge of the transcriptions fully manually conducted	DP	
Oct – Nov 2018	Started using transcription software NVivo (5 interviews) and HappyScribe (the rest), transcriptions still need proofreading and corrections, due to the tape quality, type of English participants use, and the start-up language terms Basic attribute values added	DP	HappyScribe best software, cheap, reliable and best quality
25 Nov 2018	First 21 interviews fully transcribed and submitted to NVivo11, auto coded all current interview data in NVivo, auto coding conducted using questions from interview guide	DP DA	
25 Nov 2018	First thematic codes tested/created (Figure 1), the thematic codes are in alphabetical order	DA	
Dec 2019	Created a very first draft of illustrated model of venture creation process (1 Dec 2018) NVivo advanced level course, 1 day Topics covered: case attributes, queries, matrix creation		University of Surrey, UK
Jan 2019	Changed the version of NVivo11 to NVivo 12		

Date	Actions		Additional information/ notions
5 Feb 2019	Started manual coding with the first interview with digital-related subjects, not using auto coded data	DA	Coding with 'What are participants talking about digital-related subjects?'
23 Feb 2019	Abandoned the idea of coding with digital-related subjects, too much is digitally related. Started looking at nodes in NVivo, decided to start the first cycle of coding with the time-related actions (following the interview guide), antecedents of previous experience, trigger, basic image of the idea. Created a structure for the 1 st cycle of coding (see Figure 2), parent and child nodes	DA	Decided to make numbers in NVivo to keep the order of actions with the correct order instead of alphabetical order
24 Feb 2019	Decided to start coding using auto coded data in NVivo, using the thematic codes. Added colors to the themes (nodes), useful tool to see what parts are already coded. Needed to moderate the coding structure the changes are made while coding: <ul style="list-style-type: none"> • Moderators merged into the 3 Idea development parent node • Digital building blocks merged into the 3 Idea development 	DA	13 interviews still need to be proof-read before submitting to NVivo
25 Feb 2019	Needed a new node with context of location, moved <ul style="list-style-type: none"> • value creation • platform talk • critical events talk • developing with less effort talk • doubting the idea under the parent node 3 Idea development, because they seem to overlap, and this point cannot make it clearer (see Figure 3) Updated the draft of venture creation model of findings	DA	Proofreading transcriptions
26 Feb 2019	Took screen caps of the thematic coding creation. The phases that could be general for all interviews are: <ol style="list-style-type: none"> 1. Antecedents (previous experience, trigger) 2. Idea initiation (basic image of the idea, customer problem, opportunity identification) 3. During the idea development (opportunity evaluation, development, exploitation) 4. Outcome 5. Future (next steps) Wondering whether a timeline of interviewed start-ups would elaborate something? Updated the draft of venture creation model of findings	DA	Under parent node 3 Idea development talk, the child nodes overlap. Moved all nodes under general node (3). Seems idea development happens in very different order and in many different ways
27 Feb 2019	Submitted 4 interviews to NVivo, 9 interviews to go (proof reading needed)	DP	target to have all transcriptions in NVivo by Friday 1 Mar 2019
28 Feb 2019	Proofreading final interviews, decided to include in the secondary information data the terms included in the interviews that need clarifying, e.g. Zapier, Lamp Stack	DP	
3 Mar 2019	All interviews transcribed, proofread and corrected, and submitted to NVivo (except for one). Auto coded them all with NVivo. Continued coding from auto coded data, realized that probably should have only 5 parent nodes in the first coding cycle themes as following: <ol style="list-style-type: none"> 1. Antecedents - previous experience 	DA	

Date	Actions		Additional information/ notions
	<ul style="list-style-type: none"> - trigger <p>2. Original idea, basic image</p> <ul style="list-style-type: none"> - uniqueness of the idea <p>3. Development of the idea (opportunity development)</p> <ul style="list-style-type: none"> - no sub codes here yet, and see afterwards where they go <p>4. Outcome</p> <p>5. Future/Exit</p> <p>Will continue coding but in this manner, and realized that the node 3 Development of the idea has to be started from the scratch again in the second cycle of coding. This meaning, that have to look again all the data in the parent node 3 again to see, what will be the child nodes, because that my still change</p>		
7 Mar 2019	<p>Started to add more attribute values to cases in NVivo</p> <p>Created the word cloud with two different designs (see Chapter 5 Findings)</p> <p>Continued first cycle of coding, and added new child nodes in parent node 1. Antecedents</p> <p>1.1. Previous experience</p> <ul style="list-style-type: none"> - start-up experience - studies - work experience - tech experience (computers, coding, videos) <p>1.2. Trigger:</p> <ul style="list-style-type: none"> - critical event - entrepreneurial call - new segment, user group - new technology - personal experience - timing, trend 	DA	All the interviewed start-up founders (37) had earlier experiences that influenced somehow the current venture
8 Mar 2019	<p>Coding parent node (3 Idea development talk) and creating new child nodes. New child node tree looks like this:</p> <ul style="list-style-type: none"> - create MVP, prototype - critical events talk - develop faster with less effort - digital building blocks - doubting the idea - evaluate, measure - fixed assets talk - funding - location - moderators - networks, stakeholders - outsource or develop in house - pivoting - platforms talk - study (competitors, market) - users, testing, feedback, user data - value creation 	DA	<p>Interviewed founders are talking about funding, although not asked.</p> <p>Managed to create and export the code book by NVivo (see final version in Appendix x Codebook)</p>
9 Mar 2019	<ul style="list-style-type: none"> - partnering - lean, agile way of developing - constant iteration <p>Creating also second level child nodes</p> <ul style="list-style-type: none"> - funding (bootstrapping, funding rounds) - moderators (founding team, law changing, start-up mindset) - networks (regulators, start-up communities) 	DA	

Date	Actions		Additional information/ notions
	Decided to put internet sources data and observation field notes into the different files, because the needs of auto-coding (see Figure 4) Updated the draft of venture creation model of findings		
10 Mar 2019	Added more attribute values to NVivo for the start-ups. Decided to present the data of the findings (Chapter 5) in five Sections: 1. Sequential presentation of data (thematic codes structure) 2. Digital venture ideas findings 3. Descriptive findings (nature of the process and journey) 4. Contextual findings (location, industry, digital technology)	DA	
11 Mar 2019	Added the descriptive findings nodes to NVivo under parent node Nature of venture creation process - critical events and actions (merged the critical events of child node from parent node 3 (Development) in here - iterative, cyclical - speed - time frame Created Table of the data of the interviewed start-ups (Table 1 & 2, Chapter 5)	DA	renamed the critical events as a trigger to separate the critical events during the development of the opportunity
12 Mar 2019	Added new child node User experience under parent node Opportunity development. Moved 3 child nodes (constant iteration, entrepreneurial learning, doubting the idea) under parent node Nature of the venture creating process	DA	
13 Mar 2019	Created more child nodes (trend, creating team)	DA	
14 Mar 2019	The sequential presentation of the venture creation process should be in quite high level to be able to present the start-ups studied in this research, because in opportunity development phase there are variation and overlapping in the stages of the process. The presentation of initiation, duration, outcome, and moderators is suitable of dividing the process dimensions, and under those dimensions the opportunity identification, opportunity evaluation, development, and exploitation, exit are happening. <i>Initiation</i> includes the factors affecting the initiation of the process: antecedents, trigger and opportunity identification, and discussion of the venture idea. <i>Duration</i> includes the factors during the process of developing the opportunity or venture idea. <i>Outcome</i> includes the factors of what is emerging as the outcome and factors affecting the outcome (e.g. scaling)	DA	
18 Mar 2019	Creating two tables of interviewed start-up 1) background information e.g. (size of team, turnover, age of company, launched/not launched); and 2) digital outcome, type of company, digital technology used, and used digital resources such as cloud computing Checking internet sources of company websites of additional information, fact checking (triangulation), and making a table of internet sources used, checked which of the interviewed start-ups are still active, three are not	DA DG	Table 4.8. Methods of minimizing checked
19 Mar 2019	Started writing from the memorable quotes Section using the quotes to write Chapter 6 Conclusions	DA	
20 Mar 2019	Continued writing chapter 6 Conclusions platform Section, and writing the Chapter 5 Findings at the same time (critical events, location). Checking theoretical framework and research questions.	DA	

Date	Actions		Additional information/ notions
21 Mar 2019	Continued working with Chapters 5 and 6 simultaneously. Collecting all the digital technologies, components and resources used in one table.	DA	
22 Mar 2019	Writing Chapter 5, 6 and 7 simultaneously. Creating tables of platform-based ventures, venture idea (the uniqueness of the idea)	DA	
27 Mar 2019	3 Idea development coding in NVivo.	DA	
29 Mar 2019	Continued 3 Idea development coding, added child node: locations in NVivo.	DA	
21 Apr 2019	Continued completing Table of process tasks mentioned (Chapter 5), value creation is presenting the business model talk. Checking research questions, and framework with findings Updated the draft of venture creation model of findings (Chapter 6) Findings of related to location are discussed in Section 5.5.1 related to contextual findings. Fixed assets findings are moved into the nature of venture creation process Section in NVivo. Moved scaling into 3 Idea development talk in NVivo. Decided to create one table to present findings of 3 Idea development talk with quotes including - build team, create MVP, collect data, evaluate; funding; moderators; networks; outsource or in-house; partnering; pivoting; scaling; study competitors, markets; user experience.	DA	
22 Apr 2019	Continued with 3 Idea development findings, Chapter 5. Outcome includes the type of outcomes and talk about scaling. Scaling is also a part of development because the exit strategy should be considered when developing the idea. Decided to put business model and value related talk into a separate Section 5.3.3., which includes pivoting. For the second coding cycle, need to look for value related talk (after checking the theoretical framework Fig. 3.2)	DA	See Fig. 5 of Audit trail. Scalability needs to be considered also during the idea development
23 Apr 2019	Decided to categorize the findings earlier under name Factors affecting venture creation process under the moderators of venture	DA	
24 Apr 2019	Writing Chapter 5 Findings, and having some questions. Should the building team and other moderators of the process be presented all first and then group them together in the Section of moderators? Adding the references to the framework (Section 3.3.2) and literature to Chapter 5 describing the way the findings are presented.	DA	
25 Apr 2019	Working simultaneously with chapters 5, 6 and 7. Opportunity identification and technology. Working on outcome quotes, and themes, categorizing outcomes by the types of mobile app, digital platform, digital ecosystem, software solution (e.g. SaaS). Start-up ecosystems are an outcome emerged in the study. Chapter 5 almost completed (the very 1 st draft). Check-list of thematic analysis: Analytic narrative and illustrative extracts in good balance (Table 4.17). This needs more work, there is not yet enough of the analytic narrative (Chapter 6). Will not do written memos, since the audit trail is so in detail. Also writing simultaneously chapter 5, 6, and 7, so when something comes up will be written accordingly to the correct chapter. Codebook is close to final form (3 pages).	DA	Starting going through the 15-point check list Table 4.17 of good thematic analysis
26 Apr 2019	Continuing with chapters 5, 6 and 7. Trying to complete the first draft of Chapter 5. Future included, included the structure of findings (Sections and tables), this is useful also for me. Organizing the	DA	

Date	Actions		Additional information/ notions
	coding tree according to the way the findings are presented, platforms in a separate Section, easier for analyzing to gather data in one Section. Moderators in separate Section, also for analytical reasons, also because the moderators are affecting the venture creation process.		
28 Apr 2019	Continue finishing the very first draft of Chapter 5. New finding, an outcome can also be digital infrastructure. Update the framework of finding. Finished the first draft of Chapter 5.	DA	
29 Apr 2019	Going through the Checklist of 15 points thematic analysis and writing Chapter 6. Question: Should the chronological order of tasks performed during the venture creation process be studied? One of the findings is that the sequence of the tasks can vary greatly, and come back to the beginning of the creation of the venture due to different reasons (e.g. critical event, not viable business model)	DA	
30 Apr 2019	Will put quotes into Appendix and start writing the Findings (Chapter 5) in narrative form.	DA	
1 May 2019	Rewriting chapter 5, putting most of the tables of findings to Appendix 9, and writing a narrative of the findings. Grouping the findings into bigger themes (done that already earlier), and into separate Sections for analytical purposes - searching for business model - digital building blocks - platform related talk - moderators - nature of venture creation process - contextual variables	DA	
2 May 2019	Continuing with Chapter 5. Leaving Section full rich quoted data on Chapter 5 of Search for business model (5.3.4) and Platforms and venture creation process (5.3.5)	DA	
3 May 2019	Continuing Chapter 5 rewriting. Added more explanations to the way the findings are presented, explorative, descriptive study, concentration of the themes to be able to build a model, describe the nature of the venture creation process and possible patterns. Checked the aim of the research to match the presentation of findings. Start writing Chapter 6.	DA	Appendix 9 will include the tables of findings, need to check and delete information that makes it possible to identify participated start-ups
4 May 2019	Continuing writing Chapter 6. The suggestion of initiation, duration and outcome is adapted (von Briel, Recker and Davidsson, 2018), and the loose coupling and temporal nature of digital artefacts is included in the framework of findings (Chapter 6). Ended up changing the sequence of presentation of findings (Chapter 5) into the temporal sequence, makes more sense, because this research is explorative and descriptive, also aiming at building a framework model of findings. The discussion on the loose coupling of the participated start-up digital artefact types is included in Chapter 7.	DA	
5 May 2019	Chapter 5: Included the digital innovation phases in the presentation of findings(Fichman, Dos Santos and Zheng, 2014), was left out earlier. Important part, because this research is of innovative start-ups.	DA	

Date	Actions		Additional information/ notions
7 May 2019	Too little narrative in Chapter 5, need to revise the chapter and add more narrative (Braun and Clarke, 2012), also glanced through Chapter 4: Methodology and checked about how to minimize the effects of limitations again.	DA	
May-June 2019	Analysis of the data, chapter 5. Added more narrative, and place the tables of findings mostly in Appendices. Completing writing Chapter 5. Findings.	DP	
Aug-Oct 2019	Chapter 6: Discussion chapter writing, making example boxes of the relevant quotes to each Section. Putting the cross references in place, and making the thesis into one document, which helps writing Discussion chapter, because all the relevant areas are covered (Tables of Findings, literature reviews, theoretical framework. Framework of findings has been modified several times during Chapter 6 writing, launch is placed right after outcome, and after outcome the pivoting, and aborting is added, because the interviews are saying it happens this way. You have to have some kind of outcome before you can pivot.	DA	
Nov 2019	Chapter 7: Conclusions. Implications for practice, limitations, and future research		
May – June 2020	Making final checks of the contributions of this research, decided to make a 3 rd cycle of coding. Checked via internet sources, which of the 34 start-ups are still active. Found out 22/34 are active, some start-ups were not possible to check because either they were in China (no access or one was in such an early stage that no access). Being active is an evidence of survival.	DA	

Thematic codes					
Name	Files	Referenc	Created On		
Basic idea, opportunity	5	9	25.11.2018 14:32		
Opportunity recognition	2	2	25.11.2018 14:32		
Uniqueness	2	2	25.11.2018 14:32		
Critical events talk	2	2	25.11.2018 14:32		
Develop faster less effort	2	2	25.11.2018 14:54		
Digital building blocks	3	5	25.11.2018 14:32		
Apps	0	0	25.11.2018 14:32		
Blockchain	0	0	25.11.2018 14:32		
Cloud computing	0	0	25.11.2018 14:32		
QR code	0	0	25.11.2018 14:32		
Web based	0	0	25.11.2018 14:32		
Doubting the idea	0	0	25.11.2018 14:53		
Earlier experience talk	5	6	25.11.2018 14:33		
Idea development talk	4	5	25.11.2018 14:32		
Fixed assests talk	0	0	25.11.2018 14:36		
Pivoting	0	0	25.11.2018 14:32		
Next steps	2	2	25.11.2018 15:00		
Platforms talk	11	12	25.11.2018 14:32		
Consumer engagement	1	1	25.11.2018 14:32		
Critizism of platforms	1	2	25.11.2018 14:32		
Essential platforms	4	4	25.11.2018 14:32		
Integration platform	0	0	25.11.2018 14:32		
Market Place	5	5	25.11.2018 14:32		

Figure 1. First thematic codes tested/created 25 Nov 2019 (alphabetical order done by NVivo)

Thematic codes				
Name	Files	References	Created On	
1 Antecedents	0	0	23.2.2019 12:01	
2 Basic idea, opportunity	8	15	25.11.2018 14:32	
3 Idea development talk (opportunity development)	18	37	25.11.2018 14:32	
4 Outcome	0	0	23.2.2019 12:15	
5 Exit	0	0	23.2.2019 12:14	
6 Future	2	2	7.12.2018 12:32	

Figure 2. First cycle of coding, thematic codes created 23 Feb 2019 (first level codes)

Name	Files	References	Created On
1 Antecedents	0	0	23.2.2019 12:01
Earlier experience talk	21	38	25.11.2018 14:33
Trigger	15	20	23.2.2019 12:03
2 Basic idea, opportunity	8	15	25.11.2018 14:32
Opportunity identification	17	18	25.11.2018 14:32
Uniqueness of the idea	12	19	25.11.2018 14:32
3 Idea development talk (opportunity development)	18	37	25.11.2018 14:32
Critical events talk	3	3	25.11.2018 14:32
Develop faster less effort	2	2	25.11.2018 14:54
Digital building blocks	19	46	25.11.2018 14:32
Apps	0	0	25.11.2018 14:32
Blockchain	0	0	25.11.2018 14:32
Cloud computing	0	0	25.11.2018 14:32
QR code	0	0	25.11.2018 14:32
Web based	0	0	25.11.2018 14:32
Doubting the idea	0	0	25.11.2018 14:53
Fixed assests talk	11	11	25.11.2018 14:36
Location	3	3	25.2.2019 13:49
Moderators (law, founders, values, vision, start-u	0	0	23.2.2019 12:27
Platforms talk	18	28	25.11.2018 14:32
Consumer engagement	1	1	25.11.2018 14:32
Criticism of platforms	1	2	25.11.2018 14:32
Essential platforms	4	4	25.11.2018 14:32
Integration platform	0	0	25.11.2018 14:32
Market Place	5	5	25.11.2018 14:32
Users, testing, feedback, user data	16	24	24.2.2019 17:11
Value creation	4	4	23.2.2019 12:17
4 Outcome	0	0	23.2.2019 12:15
5 Exit	0	0	23.2.2019 12:14
6 Future	2	2	7.12.2018 12:32
Next steps	2	2	25.11.2018 15:00

Figure 3. First cycle of coding, thematic codes created 24 Feb 2019 (order of thematic codes longitudinal), first, second, and third level of thematic codes

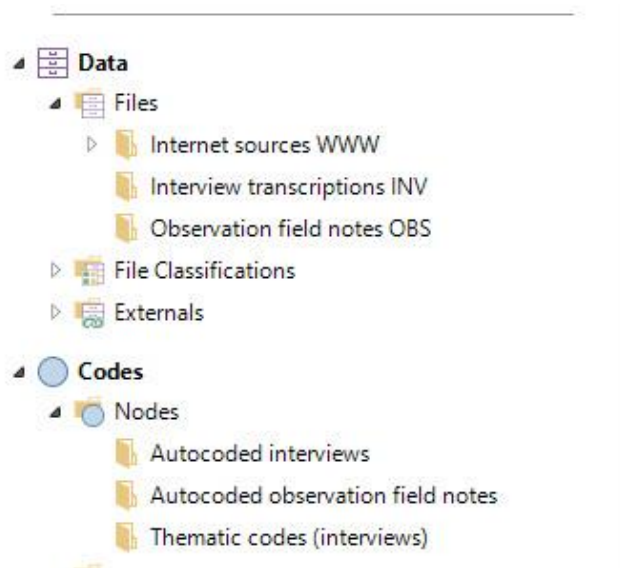


Figure 4. Observation field notes and internet sources data in NVivo

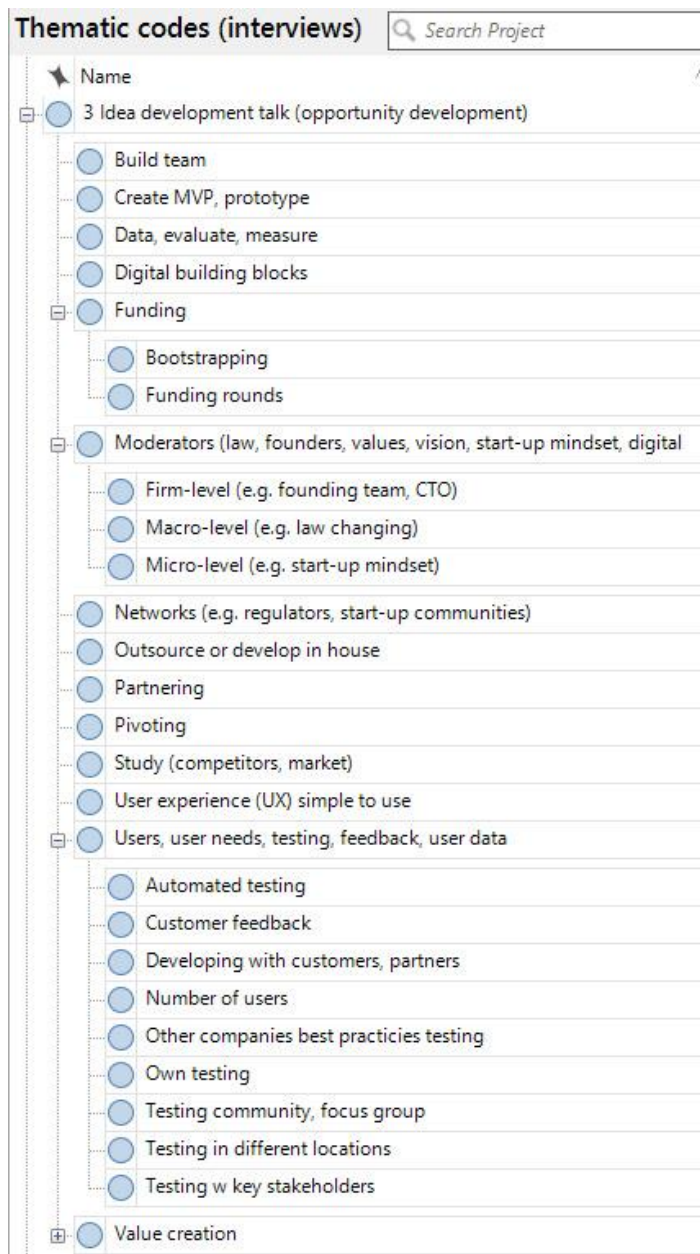


Figure 5. Idea development talk NVivo coding tree

Appendix 6 Interview locations in detail

Start-up		Interview location					Other remarks	Involved in start-up eco-system
ID	Company location	Co-working space	Company premises	Incubator/accelerator	Café	Start-up event		
01	Helsinki, Accelerator			HEL				X
02	Stockholm, Own office		STO					X
03	London, Co-working space	LON						X
04	London, Own office		LON					X
05	Helsinki, Accelerator				HEL			X
06	San Francisco, Own office				SFO			X
07	Sunnyvale, CA, Own office					SFO	AWS loft	X
08	Oakland, CA, Accelerator			SFO				X
09	San Francisco, Own office		SFO					X
10	Fremont, CA, Accelerator			SFO				X
11	Oakland, CA, Co-working space		SFO					X
12	Fremont, CA, Accelerator			SFO				X
13	Helsinki, Accelerator			HEL				X
14	Stockholm, N/A				STO		Stockholm Tech	X
15	Berlin, Accelerator				BER		Start-up Safari	X
16	Berlin, N/A				BER		Start-up Safari	X
17	Berlin, Own office				BER		Start-up Safari	X
18	Bangalore, Own office					HEL	Arctic 15	X
19	London, N/A					HEL	Arctic 15	X
20	Tel Aviv, N/A				TLV	TVL	DLD Innovation Festival	X
21	Tel Aviv, Co-working space				TLV	TVL	DLD Innovation Festival	X
22	Tel Aviv, N/A				TLV	TVL	DLD Innovation Festival	X
23	Helsinki, Accelerator				HEL			X
24	Hong Kong/Helsinki, N/A				HEL			X
25	Beijing/Rwanda, Accelerator			PEK				X
26	Beijing, Accelerator			PEK				X
27	Beijing, Accelerator			PEK				X
28	Hong Kong/Beijing, Accelerator						Video call (WeChat)	X
29	Shanghai, Accelerator			SHA				X
30	Singapore/ Shanghai, Accelerator			SHA				X
31	Shanghai, Accelerator			SHA				X
32	Hong Kong, Accelerator			HKG				X
33	Dublin/Paris, N/A						Video call (Google)	X
34	Paris/Tel Aviv, N/A						Video call (Google)	X
	TOTAL		5	12	8	6	3 video calls	34

Appendix 7 Code book

Name	Description	Files	References
1 Basic idea, opportunity	What was/is the basic idea of the venture/opportunity that the venture is pursuing?	27	40
Opportunity identification	How the opportunity was identified as worth pursuing?	28	29
New technology	Digital technology creating new opportunities	6	8
Trend	A trend in user habits	1	1
Original idea	What was the original idea? Description of the idea	4	5
Uniqueness of the idea	What is unique of the idea?	13	20
2 Antecedents	Prior to creation a venture what are the previous experiences or triggers?	1	1
Previous experience talk	What kind of previous experience the founders have?	34	50
Start-up experience	Previous start-up experience, either in a role of founder or employee	13	14
Studies	Earlier studies (e.g. university)	11	14
Tech experience (computers, coding, videos)	Technological previous experience, this can be from earlier work experience, from start-up experience or otherwise acquired (hobby etc.)	9	10
Work experience	Earlier work experience, subject specific experience. If earlier work experience is from working or managing a start-up, the experience is coded also in start-up experience	18	21
Trigger	What made the founders to start the venture?	17	26
Critical event as trigger	An event, that had a major impact on the founder(s) in a way, that (s)he/they wanted to start to develop a solution for problem.	3	5
Customer requests	People start asking for a solution for the problem	2	2
Entrepreneurial call, serial entrepreneur	Founder(s) wanted to work for themselves, create their own venture. Or serial entrepreneurs	6	7
New segment, user group	A user group that has been ignored (e.g. elderly, young generation)	3	3
New technology, price of new tech	New technology becoming available. Also, the price of the new technology becoming accessible can be a trigger.	11	15
Personal experience	Personally, experienced problem, or a lack of service/product	5	5
Timing, trend	A new rising trend in user habits (e.g. videos), or timing is right (e.g. legislation)	2	2
3 Idea development talk (opportunity development)	How the idea/opportunity has been or is developed?	32	110
Create MVP, prototype	Talk of creating an MVP, prototype (mock-up) for testing	9	14
POC	Proof of concept	1	1
Rough MVP	Rough, handmade MVP to raise funding, getting the first customers	5	7
Testing if idea possible	Testing if the idea was possible to create	1	1

Name	Description	Files	References
Trying and failing, problems with developers	The nature of creating the MVP	2	3
Data, evaluate, measure	How the development of the solution was evaluated or measured?	10	14
Collect data to understand customers	Data is collected for the purposes to understand the customers better	2	2
Look at data, test hypothesis	Looking at the data, and testing the hypothesis with the data	3	5
Using analytics for developing		2	2
Validating the idea with data	Validating the idea with data	1	1
WeChat analytics	Using WeChat analytics for the development of the solution	2	2
Digital building blocks	What are the digital building blocks/digital architecture of the venture?	29	60
Exit and strategy	Talk about exit	1	1
Funding	Discussion about funding	10	13
Moderators (law, founders, values, vision, start-up mindset, digital technology skills)	If moderators are coming up in the interview (e.g. law, founders, values, vision, start-up mindset, digital technology skills, skills needed, agility etc.)	4	8
Firm-level (e.g. founding team, CTO)	Talk of the founding team, looking for a CTO with special technological skills	2	5
Build team	Building the team, a team is when there are more than one person developing the idea	9	12
Networks (e.g. regulators, start-up communities)	Networks talk, such as government offices (regulators) or other official institutions related to the venture development (e.g. start-up communities)	5	6
Macro-level (e.g. law changing)	Change in laws and regulations (e.g. GDPR, new EU financial institutions regulations)	3	4
Micro-level (e.g. start-up mindset)	Skills, character traits	1	1
Entrepreneurial learning	Looking back how could you have developed faster or with less effort?	22	26
Develop faster	Speed hire more people	7	11
Feed back	Listening negative feedback	2	2
Focus on things that matter	Focus on things that matter	6	6
Good team	Search good team	5	5
Marketing	More resources on marketing	2	2
Study the market	Study the market	1	1
Technology	Search for suitable technology	1	1
Start-up mindset	Talk of skills, capabilities and the type of character that is start-up mindset	0	0

Name	Description	Files	References
Outsource or develop in house	Whether the development of the solution is done in house or outsourced.	6	7
Partnering	Partnering with other companies	7	8
Pivoting	Talk on changing some core part of the idea into something else, changing the direction of the venture (pivoting)	6	7
Platforms talk	Talk on platforms. The talk can be that the venture is a platform, the meaning of platforms, or how the platforms are a part of the opportunity creation (e.g. cloud computing, using FB for advertising)	25	42
Consumer engagement	Consumer engagement platform, also used for consumer feedback	3	3
Criticism of platforms	Criticism of the way platforms are seen or discussed	2	4
Essential platforms	Talk on how important and essential platforms are	9	12
Integration platform	Application integration platforms	3	4
Market Place	Platform acting as a two or multisided platform, which is a market place. Putting sellers/producers and clients in contact.	8	9
WeChat platform talk	WeChat platform-based development	2	5
Scaling	Talk of scaling of the venture	11	15
Study (competitors, market)	Talk of the studies conducted during the opportunity development	11	13
User experience (UX) simple to use	Talk of user experience, the meaning of user experience in opportunity development process	6	8
Users, user needs, testing, feedback, user data	Discussion of the users, user needs, testing with the users, what kind of feedback is gathered, how the generated user data is treated. Looking for product-market fit, data-need fit, problem-solution fit	25	61
Automated testing	Testing done by a program, not with humans	1	2
Customer feedback	Talk of customer feedback and ways to collect and use customer feedback	8	8
Developing with customers, partners	How the venture is developed with the customers, could be design partners, could having several customers as pretesting the solution before launch	8	10
Number of users	Number of users of the solution	2	2
Other companies' best practices testing	Looking at other companies and their solutions and best practices	1	1
Own testing	Friends, family, your own testing	2	2
Testing community, focus group	Having a test community or a focus group of customers for testing purposes	2	2
Testing in different locations	Testing the solution and getting feedback in different locations	2	2
Testing w key stakeholders	Testing with key stakeholders, used in FinTech sector especially	7	8
Value creation	Value creation talk, either how the venture is monetizing, or what kind of value is created for the customers.	11	14
4 Outcome	Discussion of the outcome of the opportunity development (e.g. product, solution, web-based solutions, web pages, mobile app)	5	5

Name	Description	Files	References
5 Future	What are the next steps for the venture? How do you see the future?	19	38
Generate sales	Need for generating sales	2	2
Go international	Plans for going international	2	3
Look for funding	Starting to look for funding or additional funding	5	5
Monetizing	Starting to monetize or find ways to monetize	1	1
Next steps		4	4
6 Nature of venture creation process		0	0
Constant iteration	Talk on development process and the constant iteration with business model, development of the MVP etc.	11	16
Critical events and actions	Critical events happened during the venture creation process, and what were the consequential actions	16	19
Business model, pivoting	Talk about how critical event resulted in change of business model or pivoting	6	9
First user, customer	Talks on first user, or customer and what was the meaning of that, and how it happened	5	5
Funding related	General talk about funding and money as a critical event	6	7
Partnering	Partnering seen as an either negative or positive event	2	3
Radical change in competing environment	A critical event in its true meaning	2	2
Regulations, law	External enabler, change in regulatory environment, or talk of law	2	2
Relocating to start-up ecosystem	Critical events concerning start-ups ecosystems	4	5
Team related	Critical events concerning team members, founders etc.	8	8
Technology related	Critical events concerning technological events	6	9
Doubting the idea	Talk on doubting the original idea	20	20
Evolving idea	The idea is first something, but it evolves to something else	7	10
Fixed assets talk	Do you have fixed assets?	13	13
Lean, agile way of developing		5	7
Locations	Talk of the locations, either where the start-up is located or where the development is located.	6	7
Speed	Talk about the speed of the process.	1	1
Time frame	Discussion of the time frame of the venture creation, earlier experiences, when the idea was identified etc.	3	3
7 Context (location)	Discussion about the location where the venture is based.	9	13
Memorable quotes		6	7

Appendix 8 Tables of detailed findings

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Table 1. Basic idea

Themes	Quotes
Digitization of financial Sec- tion, new de- mand, new services	<p>We are part of FinTech industry. Banking as a whole is not necessarily growing but the FinTech part of it is. I think there is a huge demand for digitalization in banks and mainly driven from customers' expectations of more transparency more "I'm in control" and I think it has been kind of monopoly system with banks for many years, so mainly technology is taking away that monopoly from the banks, which is then pushing for or is increasing competition. And competition is mostly about transparency, user experience smoothness etc. Our service is new innovative, standard financial services (FinTech), In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work. (STO-02)</p> <p>Looking at financial inclusion, a system for people who are working, who don't have bank accounts, and who need money straight away (03-LON)</p> <p>One stop platform for trading financial products (32-HKG)</p>
Data driven	<p>We leverage the mobile phone, the smart phone to create that data driven engagement between the retailer and the consumer. (04-LON)</p> <p>We help marketers implement on the website the tools that they work with and send these tools data. By these tools I mean user engagement on the site. (21-TLV)</p>

Themes	Quotes
Artificial intelligence based new idea	<p>[We are] creating a deployment platform for deploying devices. if you are building an application should know how to build a neuro network that satisfies your users' needs. And we'll deal with all the optimization staff to make easy for you to use. (08-SFO)</p> <p>Our idea is based on artificial intelligence, we have developed some engine, that can recognize appropriate content inside of the traffic. (20-TLV)</p> <p>So, we are a translation company but not a traditional one. What we began was a machine translation. So, we are a translation company but not a traditional one. What we began was a machine translation (27-PEK)</p> <p>Using machine learning it can help to shorten the time immensely, help to alert you to potential new trends in policy forecasts or specific topics by environment protection or financial risks. (28-HKG)</p> <p>a tool that will reduce the amount of time that people are spending transcribing their audio and video files. (33-DUB)</p>
Algorithm based	<p>We are setting up a market place, which connects the customers to food, beverages, retail, and even with digital vouchers. That you can in your convenience discover personalization, and we can bring those all together for you as a consumer. And, and for you it would be in a form of an app and then we are handling the logistics in the personnel that are actually provide that delivery to you. we have recommendation technology ... we have the recommendation engine (07-SFO)</p> <p>We infused the knowledge from normal head hunting into the platform, and try to make it as autonomous as possible. So, there is no human interaction from our side needed to get it done, it is solely done by the requestor and the helper, so it brings down the cost on both sides. (17-BER)</p>
Innovative way of marketing and advertising	<p>Because back in time e-commerce was more focused on transactional side of it, and it was more of a transactional environment oriented. But right now, I added a little bit more content with the content, and that makes this transactional environment to become more ... I would say more interactive with social aspects. So, we use content to attract followers and while the same time build distinctive personality that is acting as a shopping guide. (29-SHA)</p> <p>We also want to create culture of the car in China for the younger people. (31-SHA)</p> <p>The basic idea of our business is to rethink and reinvent the way of advertising of the world business model of advertising. By basically turning the advertising budget of advertisers of the nations to non-profit organizations. (34-PAR)</p>
New ecosystem (blockchain based)	<p>What we are doing is, we are creating a new version of the internet, we could say. We call it Web 3.0 (24-HKG)</p>

Table 2. Uniqueness of idea

Themes	Quotes
User experience	<p>The technology was around it wasn't completely new, we basically did it in Sweden, it had been done elsewhere. There had been a similar company, but they didn't get the product to work. They've done similar stuff. So, we were not even the first ones but we were the first ones who actually had something people wanted to use. In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work. Maybe one of them had the technology but the user experience ... (02-STO)</p>
Real-time System and data	<p>A real time payroll system. So that's a system whereby worker is going to work and the workers go out of work and actually the wages are calculated in real time. (04-LON)</p> <p>First of all, it is not that easy to get real time data, you really need to be in this industry. Secondly the instruments that we are doing is [FinTech industry product], which is quite a tough instrument. Easy money you don't pick, your pick tough money. (32-HKG)</p>
Combining technology to	<p>Unique is the way we combine the technology, because there are already QR code manager out there, but we combine that all together, and you can do the process from A to B. That is pretty cool. And we have the focus on feedback. (15-BER)</p>

Themes	Quotes
do the process from beginning to end	
Matching algorithm, number of categories	The new is the matching algorithm and the number of verticals integrated in one platform, or categories. (17-BER)
Not hackable system	It's very specially encrypted technology ... secure password, which is generated ... And the beauty of the whole system is, that system is offline ... so it cannot be hacked into. And every transaction you do with the system are new, unique crypto pass generated which allows the access. And that is where the uniqueness of the system lies. (18-BLR)
Verification on demand	We can make the verification on demand, as we are doing right now, we can do it actually all the time. We can put some machine inside the content provider, hosting provider, any type of content even big enterprise was the problem of any type of traffic go out of the organization, can be a problem with it. So, we can filter it out with our some kind of next generation of fire wall, and now we are trying to get interest of those companies actually. (20-TLV)
Simple, real-time, protect from data loss	We help marketers implement on the website the tools that they work with and send these tools data. The uniqueness is the simplicity, how simple it is. We protect from data loss. But using the developers to do that, it's really prone to errors, and things then to brake. And when using our solution, we also monitor the data on real-time. (21-TLV)
Easy to use, user experience	It's the first blockchain solution, which is easy to use. Blockchain is pretty difficult nowadays, so we have been focusing on building the user experience so easy that we have a slogan, that so easy that even your grandmother can use it. (24-HKG)
Easy to use, simple, better quality, flexible	We provide the same and better quality more flexibility because we don't have to get a booth we don't have to get any equipment. You just need to have a phone and a laptop, you can you can distribute and profit from those after the event. (27-PEK)
Standardized solution (product)	One is more on the backend, how we deliver to our clients. So, clients might not feel the difference, but I want to create a standardized product and make consulting scalable, the business model now is to have a consultant that's very experienced and helped serve the client specific needs there are similarities and somehow repetitive and they could be standardized. (28-PEK)
Personalized, human touch	What I'm doing different, because I'm providing rich content, and also building this distinctive personality. With that human touch, for this brand people are more likely to trust the brand itself. And they're more likely to buy whatever the brand is selling, because it is more personal. (29-SHA)

Table 3. Previous experience

Type of previous experience		Description
Previous businesses (owner)	13	Restaurant, conferences, hot dog stand, online liquor store, event company, importing from China, TV and DVD manufacturing, night club, pub, candy factory, van hire company, web site development, gaming
Work as start-up employee	2	AI experience (company later sold to Google), sales
Work: business related	15	Investment banking, consulting, payment sector (PayPal, VISA), sales of TV-programming, pizza delivery driver, banks clearing systems, headhunting, marketing, NGO organization for elderly, travel agency, financial policy and technology, media, finance industry, trader of hedge funds, head of advertising
Work: technology related (technology, role or company)	9	10 years software development, web site development, AI background, Verizon Wireless, Apple Horizon, full stack developer, Nokia, Airbus, IT-consultant, e-Commerce
Studies	2 PhD	Berkley University, US (PhD), MIT University US (PhD), 42 Silicon Valley, US, College (mathematics major), engineering, Harvard University US, Stanford

Type of previous experience		Description
		University US, Aalto University Finland (artificial intelligence), information systems, Beijing Institute of Technology China, advertisement, Chinese Academy of Sciences (PhD microprocessor design and verification), Cambridge University UK (chemistry), University Polytechnic Barcelona Spain (computer science), Dublin City University (machine learning), Wharton School of University of Pennsylvania US
Hobby		Interested in computers since childhood

Table 4. Triggers

Trigger	Quotes	refs
Critical events	<p>Had a restaurant chain, and the effect the Hanshin earthquake had, the restaurant was destroyed, workers were not paid & internet café refugees, lost homes and employment (#03)</p> <p>Financial tsunami, the Lehmann crash, effects to savings and investments (#32)</p> <p>Scandal in Germany of kindergarten children gotten sick of fruit yoghurt with strawberries originally from China (#08)</p>	3
Customer requests	<p>We started getting these questions about machine learning, and getting them on imbedded devices, like phones. And suddenly we have more of those questions, instead of what we wanted to do (#08)</p> <p>Delivery drivers started to message me, are you gonna make the app we were talking about, up the point that more drivers were requesting it and then people were even telling me, if you are making the app you should do this with it. I was getting feature requests for app that didn't even begin to exist yet, I realized it had real potential. (#10)</p>	2
Entrepreneurial call	<p>We wanted to be back on the creative side again, we wanted to be entrepreneurs again (#02)</p> <p>We realized, both wanted to work on this type of performance type of computing space, built something, but didn't want to go to a big company. The two of us realizing what we were actually trying to do a company. (#08)</p> <p>I had another business, and I sold it, and I was looking for some new businesses to start, and I decided to host a conference in order to meet smart people so that I could partner with them (#09)</p> <p>I worked in two start-ups, they are all young and passionate of what they do. That's a big thing and drives me to the start-up scene. (#15)</p> <p>When I first started my business 11 years ago, I felt at home. It is much easier for me than just be an employee. (#21)</p> <p>I plan to leave the company in June so I delayed it for three months. So, I left in September. But I knew I had to leave, it was not an option. It was not like a hard decision. It was for me my life ... if I can't do what I am passionate about, then it's not worth living. I knew I was wasting my time there. I was not using the platform, I was not performing well, I wasn't being myself and I hated myself trying hard either. I knew it wasn't it wasn't healthy for me. Even if I fail with my start-up, I would have learned so much more than there. So, failing for me is not a scary thing. If you can accept the loss then it's fine. (#28)</p>	6
New segment or user group, customer requests	<p>I read about Fox News and CNN, the average viewership age was like 70 years old, it's very old, if these multi-billion-dollar companies have audiences that are 70 years old and they are dying, young people need a new source of news. (#09)</p> <p>problem with urban living is that if you need help, example as an elderly, most of them are not in the networks of Facebook or Instagram, so it is difficult to reach to the neighbours, (#22)</p>	3

Trigger	Quotes	refs
	We want to take some younger content for them to know about the car industry, and also want them have culture of the car. We also want to create culture of the car in China for the younger people. (#31)	
New technology and price of new technology	<p>I loved e-mail, decided to start an e-mail marketing consultancy, I ended up becoming a solution provider, licensed software, and branded it. (#06)</p> <p>Two things coming together, one location-based services that was using Bluetooth, how do you automatically connect to things and people that are nearby, and that was coupled with desire to create a better social media environment (#11)</p> <p>A photo realistic graphics project, an emergent field where this particular advanced technique, Pixar and Disney and DreamWorks are all shifting over to it. (#12)</p> <p>I told my co-founder there is a different way to manage this through the blockchain. (#14)</p> <p>To use the QR codes to link the mobile content to a product (#15)</p> <p>Knowledge from normal head hunting into the platform, and try to make it as autonomous as possible, no human interaction from our side needed (#17)</p> <p>Generate simple, secure and sharable passes through mobile and use the mobile as access for physical systems (#18)</p> <p>We developed an app for the younger generation (#22)</p> <p>We understood about APIs related to Google, then Google launched the map services and mobile devices got GPS capabilities. It was the price of technology that had gone down, that gives the opportunity. (#23)</p> <p>I started to learn about the big data, the next big thing which were the big data, algorithms, payments, robots. (#32)</p>	11
Personal experience	<p>I'm addressing kind of a personal problem (#07)</p> <p>The idea behind this was I actually held different positions as a delivery driver, and during those times as a delivery driver we used to talk about the fact that, wish there was an app to do this (#10)</p> <p>Part of it was we ourselves were feeling the disaffected by the social media, we have a need, I wonder if other people have a need. (#11)</p> <p>This started as an interest of mine. (#12)</p> <p>Personal experience. I was ordering taxis and the whole thing sucked. (#23)</p>	5
Timing, trend	<p>Maybe it was the point in time, because I was close to my bachelor degree to start with another project (#17)</p> <p>There is the trend, people are moving from pictures to videos, so that is a trend that is already happening, you can see across the social media platforms and so they are moving. (#19)</p>	2
Total		32

Table 5. Creating MVP, POC

Themes	Quotes
POC (proof of concept)	<p>Yeah, we did test we give it out for a few people try it out. We took some revisions and that's how it has taken good 9 to 12 months to evolve. And now we have the POCs (proof of concept) complete, we have the first lot of trial production running. And we also have next range of products, which is also now POCs are almost done. Where we retrofit a small device for your car, to get access through your mobile and sharable. So, which again is on the similar technology and allows you to get your secure access to the car, allows you to share the car with your family, friends. Maybe you can even give it to a share pool cars. (18-BLR)</p>

Themes	Quotes
Rough, hand-made, primitive, quick and dirty	<p>So that was it, and then we created very quickly a prototype and we had a first cold call and first meeting with a big energy company, and in that first meeting they bought our idea and both our service. And we did really didn't have anything ready, only this is problem that we were able to show that like the mechanics of the application of the solution. So that was the starting point. So, we got interested and enthusiastic about it and then 2016 like in March we had the first like minimum viable product which was a lot to do with like a handmade, I mean more like a and not like computerized but more like a lot of like a handmade Word work needed to be done to offer our service. But that was the starting point then we actually got quite a lot of customers in the beginning and it was due to the fact that there was this government subsidized money (5000 euros). You know we said and then we got it quite rapidly like 30 customers and like a pretty decent revenue. (13-HEL)</p> <p>We started with rough MVP, and raised money with it, we raised 100k from angel investors with the MVP (Jan-Feb 2017), and then also we started to attract the first users and the user feedback we got. (17-BER)</p> <p>We build the architectural schema, what will be the modules of this system, we'll connect this one, and here this one, and here we manage process, all kinds of things. And we think how to predict and prevent the problems for example, bottle necks in the system. It is like a reflection on the water, it is going to build something very small, quick and dirty solution, and then we are thinking how to deploy, what will be the way even to develop. How we will manage the developers, what kind of developers do we need for this solution. And then we build the process of development. And then we start the development itself. (20-TLV)</p> <p>we joined the accelerator and they helped us to develop the MVP, the pilot. And then we won in May 2017 in accelerator competition, we got the first investment (22-TLV)</p> <p>And then I propose it, and I did the first mobile effort. It was coded by a team. So, I had this idea, and then I had to implement that, right. And, I'm not a programmer, but I know how and then I actually started drawing, what I want to do. And then after drawing, you know the basics sketch, you know, and the idea what insight. Then I asked my sub-coordinator and my team to continue developing it. So, I just drew them in a PowerPoint or on the board and then ask my teams to you know can you do this for me and make it nicer. But basically, it is what I want, from this to that and from that to this, you take this and it will go to that. So, it was very primitive. (32-HKG)</p>
Testing if idea possible	<p>... and it worked out, so we basically built a simple web service where you are just putting your bank credentials and we went on to fetch that for you from the banks and present that in the web service, that was boring, numbers basically. Then we kind of understood that it's possible to get this data, and what we can do with this data. But the most important thing was that it was possible. (02-STO)</p>
Trying and failing with developers	<p>Our CEO was nervous to talk about the idea, because he was afraid someone might copy the idea. When we met a couple of times and then we started to work with the developer, the other one, the first one. The first platform prototype was November 2017, but when we kicked the first developer we kicked the first prototype as well. And because he was very unstructured the prototype was too, so we began to build a new prototype with a new programmer and this was ... we finished two months ago (February-March 2018). (15-BER)</p> <p>So, we started to work on a prototype, and just the prototype alone was about one year working on it. And it was literally trying and failing, trying and failing (2018 May, starting 2016, now it's like one year and seven months we have been working on it). We did a prototype, worked on a prototype, and some things was good and some things wasn't good, the ones that wasn't good we took it off and we worked on it the whole year. Ah it was like finding the right programmers, and there was the start, we did try out like three before finding that is actually working and doing a proper job. Second thing was the decision the prototype was good enough and we could move on to do the proper app, so and yeah. Finding the right people, finishing the prototype, and moving on to do the app. (19-LON)</p>

Table 6. Collect data, evaluate, measure

Themes	Quotes
Collect data for serving/ understanding better customers	<p>We are trying to collect as comprehensive profiles of people as we possibly can, to make our matching algorithm as smart as possible. And also, to deliver the best service to the client, the more data you have of your clients the better you can cater them. (17-BER)</p> <p>We don't target to collect that data from them (users) yet. In the future we will, the process of developing the individual risk assessment model. But that is not a privacy data because what we're trying to do is say it's say is a population distribution. So, we are not trying to target individual knowledge. So, we are not targeting to know you better. We are targeting to first to develop a standard and understanding the population first. That is the first step. From that population, then we know where you are. Say for example, are you high risk or low risk, or a medium risk person. How do you know if you don't know where you stand in the population? So first of all, we have to find a population then we can tell you where you are. (32-HKG)</p>
Look at data and test hypothesis	<p>We re-evaluate everything. No, we don't feel we are locked in some way. Typically, we don't ask for customer feedback, we look at the data and see how people behave. If we introduce new notifications we probably AB test it, meaning we have a sample of people who gets the new notification and a sample who doesn't. And then we see how do they behave afterwards. If we see the retention or that they are happier we scale. Typically, we have thesis on what's most important right now, is it monetization, retention, and when we do we have a number of thesis, how we can prove retention or growth, we send push notifications in smart ways, when you get paid or get salary or low balance, and push you at the right time, people will use the app more often. (02-STO)</p> <p>The second part of what we have done, is we kind of pull data together, looked at it and said, here's an idea that answers some of these questions we have heard. And we made a platform, and we put it in an alpha stage, we got a little bit feedback on that and its ... Even though we didn't get a ton of feedback on that, we got some unexpected feedback. And the second thing, when someone asks us, we can point to that thing, we said we have a thing out there, and it's already on alfa stage and we are trying to figure out the features we should add to make it really useful for people. So then that conversation goes a little bit better than conversation when we have nothing, than we are here to see what you need. (08-SFO)</p>
Using analytics for developing	<p>I am not technical, I don't know how to build anything. A lot of the stuff we've done we look at analytics, like Google Analytics, and we look at excel, we analyse the numbers and make judgements. But then half the time, we just kind of like at least it is changing now, from when we were first starting, it was just like which way is the wind blowing. We were just figuring everything out. Now I have a team which just presents data, and we make decisions of it. I am not very good at looking at it. Now that we are making more revenue, it becomes more serious, in the first handful of million dollars you just kind of take a stab, and say, it worked. And then when you scale there is a lot more data. (09-SFO)</p> <p>We are trying to see the analytics of the app and data, and from there learn how we can improve the service for them. How can we do that better and to make them more reachable, more inviting them. If we publish the request and no one is taking the request, it can happen. It is not happening a lot, but it is happening, then we want to see why it is happening. (22-TLV)</p>
Validate the idea	<p>Well, there's a lot of pros and there's a lot of cons to it actually. Like I said earlier, half the time I don't give a shit about the data. In order to come up with a cool idea for a product, the data is not going to tell you the answer. There's a famous story, I don't know if it's true or not, but Henry Ford, the guy who created the car, he said if I'd listened to data, I just would have made a faster horse instead of a car. So like data is a double-edged sword, it is almost as art, instead of science. I ignore half of the time, the other half I listen like crazy. Data does not necessarily help me come up with a cool idea. You will come up with a cool idea and data is going to help you to validate it. (09-SFO)</p>
WeChat analytics	<p>I have a lot of users. I think it's a big thing in WeChat that they actually have a back end. You can check on that. You don't have to go and do the analysis. (29-SHA)</p> <p>We will see the data. We have the WeChat data analysis. It's open data from the Web site so we can check it and track it. The right thing is, every company should have their big data, not only for all people can see, they need to have the secret data. As we are a start-</p>

Themes	Quotes
	up, we don't have the money to get all that backend data. So, you see how many people have seen it like 2400 and 52 has put the thumbs up. I think every company should have this tech knowledge, to know that not, only for Toutiau or WeChat, because we just see the open data we need some more secret (backend) data. (31-SHA)

Table 7. Funding the venture development

Themes	Quotes
VC funding	'Well, first round we raised 500k euros, mostly from people who we knew or kind of were introduced to, it's not family and friends. It is more like someone knew someone who was investing in this sector. We just met a lot of people and pitched the idea, that was just before we had anything, we just basically had the power point presentation. After a year we raised 3 million euros. After 2-3 years we raised 9 – 10 million euros from a venture (capital) firm.' (02-STO)
Funding from partners with same goals	So, we are looking for funding from partners see who have the same central goals. (03-LON)
Funding rounds	'In the meantime, we created a company and we raised initial capital. Probably a million dollars in that in that period. And then, we launched in one location. We raised another round, which we also called the C round. We raised another four million dollars in seven months. It was a good idea, and we had connections. It was a good team, plus that I had done that before. And I was also a venture partner in a fund, which was big sponsors of our company.' (04-LON)
Funds from government organization	'We just got funding from a Finnish governmental organization, but we will probably start the first funding round this spring. We have three private investors.' (05-HEL)
Friends and fools funding	'I have been relatively successful with my time here, because of my peers. I've got a lot of friends, who are very rich and successful, and they would give me money to start stuff. And they would trust me. I raised a little bit of funding myself. Not VCs, just rich people, about 30 guys who gave me 25 grand each (25.000\$). I just weaselled my way to their office and now we are friends.' (09-SFO)
Self-funding	I am funding myself. Actually, in eCommerce the funding is simple, because the margin is there, so you don't really don't rely on funding money to build anything. Because it's a different route. Back in time to start up, you know, investment and stuff. But right now, I'm thinking of, I just want to do it myself, because back in time like you have to listen to the investors. So back in time it was a different way of doing start-ups. You got investment you got, you know, A Round, B Round, and C Round, and you go public and you got sold and you exit from your business. That's how it works. But right now, I'm thinking I just need something that have cash flow. It makes me feel more comfortable, you know. Like back in time is burning money from investors. It's not your money. You don't feel too much pain. But still it doesn't give you a sense of accomplishment when the competition was so big in certain markets. And it was just too tiring. You know, you just keep rolling the balls you have keep you know getting bonds and you don't actually get to sit and actually thinking about how you make your business more creative, more fun. Yeah. It's just me. INTERVIEWER: And you have one advantage, one point three billion Chinese people. Yes correct. (29-SHA)
Crowd-sourcing	'We raised around like maybe one thousand euros. So, we actually didn't raise anything until we realized very fast once we started with crowdfunding project that you can only be successful in a crowdfunding project when you already have a community around you. This is what we didn't know before. At the moment I still would not try it again. I think I would wait until we have a more stable and reliable community.' (16-BER)
Seed round ICO (initial coin offering)	'We started with rough MVP, and raised money with it, we raised 100k from angel investors with the MVP, and then also we started to attract the first users. The 100k was seed money. We are doing the ICO [...] we need an approval, this is what you have to do in Germany. It is like the financial authorities, they have to approve that our coin is not a security token, you are in the same sphere as an IPO (initial public offering) and we don't want that clearly. We need a disapproval that we are not like into this sphere and then afterwards, it

Themes	Quotes
	goes forwards to marketing, and actually you are raising the money and implementing the software to make it possible for payers to use our own token on our platform.’ (17-BER)
Months of struggling (bootstrapping) Seed funding	‘We got into a situation that they wanted to invest in us and it’s a state-owned company, which gives us some limitations and certain culture. The term sheet they gave us was totally unacceptable. And the thing is, the good thing was that my co-founder was actually a student in this University and being a full-time student to can get into this accelerator. And if you are in an accelerator up you can get free legal advice, free services which is perfect. And when we did we took the term sheet out to the lawyers there and they just looked at me and said don’t sign this. So, four months of struggling and trying to think about what’s up with the company. And so around June it kind of started, we got our first seed (funding).’ (27-PEK)
First developing the solution, then looking for funding	‘2015 when we first had the idea. But it took us about six months to open bank accounts and set up the company and find the first batch of founders. INTERVIEWER: Have you had your seed round or something? Oh, this is the problem. Unlike other people which go out and get the money first, we actually produce first before we start thinking about that. We did the reverse. Meaning that we are trying to prove something, we actually just launched it, like, what we want. Actually, you can use it. It’s not a prototype anymore.’ (32-HKG)

Table 8. Outsourced or in-house development

Themes	Quotes
In-house vs. outsourced	<p>‘So that kind of helps that we’ve got Chinese developers, we got Indian developers and Bangladeshi developers. Well what we also did on the version during that that time, we had an outsourced app. We didn’t like that. So, we started to hire some engineers in 2013, in the beginning March. Know we started with a prototype in July, the summer it was with these guys, that our partner developed the first version of the app. That’s when we launched the beta version, and then that’s how we launched also the full version in January 2014. But in the meantime, we hired a number of engineers, 3 actually, one Android, one IOS, and one what we call the backend platform engineer. We’ve replicated the whole platform from scratch. We wanted to have everything in the house.’ (03-LON)</p> <p>‘It was outsourced to Pakistan and then to Brazil, but I am based in London. And that’s where it is going to be, the head office.’ (19-LON)</p> <p>‘About 10 developers in house. Plus, we used the WhiteSource, and out sourced services whenever we needed.’ (23-HEL)</p> <p>‘So, they are still debating today, and luckily in the past six months, because I find it so difficult to find good developers in Hong Kong, I started searching outside. So, I go search for people in China. We started from China, and I find it is not that successful, because sometimes their code coming back is Chinese. The coding is in Chinese. So, it will be very difficult work with the other people in the world. Then I got lucky to have an Indian intern.’ (32-HKG)</p>

Table 9. Partnering with

Themes	Quotes
Bigger companies	We do have partners, actually bigger companies who are partners. We can’t do all that, the servers ourselves we can’t do all the calculations also. So, we do have partners who are helping in sales as well say that say it’s internally but also, we get partners involved. We try to be as lean as possible, and we also have people from the outside looking at our system and we need to change the user experience or the user interface, we have people helping us out like you all internally and they know more about the local markets for example. We are partnering with a bank. (03-LON)

Themes	Quotes
Design partner	<p>Companies, that we work with we meet couple of times a week. We work with three companies and after this interview I will meet with one CTO. We talk a lot to get their personal opinion on our platform, if they find something. (15-BER)</p> <p>One design partner is a huge publisher, they have two-sided business, they are a publisher and on they generate revenues from ads, they also have a software solution for publishers, which allows them to create polls and quizzes using this software. So, they have implemented our code, so every need that they have to correct something, they contact us, to make sure we are able to do that, and if we are able to do that they just go ahead and log into our platform and they do it by themselves. (21-TLV)</p>
Municipality	We did co-operation with Tel Aviv municipality. (22-TLV)
Industry specific partners	<p>And second, most important was, how big are the flows, are they significant enough for this. It was also because we wanted the test setting, the proof of concept. So that's the part of the reasons we went to these countries and build the networks there. And it took some time. We didn't think so much about the legal side, because we were thinking we were just going to be the intermediary. And then, actually, the place where got into a little bit of trouble was in Sweden, because we had one bitcoin exchange firm here we were working with, both the tax authorities and Financial Authority, and the banks in the developing stage of blockchain industry, they haven't been all that helpful to bitcoin exchanges even in Europe, and one of the points of that was that they could not operate with unlicensed companies like us, so basically, they had to throw us out. So, if we are familiar with the legislation and we can just follow the necessary procedures without obtaining the licence ourselves, and we can work through licensed partners. (14-STO)</p> <p>Actually, I am teaming up with some other professional video companies. They make videos and commercials for a big company. And we are going to build more original video contents and with the contents we can attract a lot more traffic. (29-SHA)</p>

Table 10. Study competitors, markets, product-market fit

Themes	Quotes
Competitors process	We needed to come across the new concept, we studied what the competitors were doing, studied their process. (01-HEL)
Other companies' best practices	<p>And we are looking at other companies that are doing this in this space. So, part of it is that you are doing your designing with familiar experiences. Something that is inherently easy for you to use by taking the best practices of what they do and following the guidelines for the development.' (07-SFO)</p> <p>We needed to come across the new concept, we studied what the <i>competitors were doing, studied their process</i> and we boiled down the key elements, that deliver most value to our customers. Then we write down the offer and send it to our customers and validate that in real life. We don't do any demos, we don't do any beta testing, we do beta testing in real life (10-HEL)</p> <p>Is this really a problem the customer wants to be solved? That's one question. Even as important is, are there already strong players on this area, who have solved that? Or do we have the capability to build this as our start-up resources? Because start-ups are clearly very limited on resources. (24-HKG)</p>
Case study	We decided why not we look at something and we also did one small case study. We felt that people were keener if they have something which is their own personal. And they don't mind sharing it between their family members though. We have filed already few patents, and there are more going to be following. We have filed and for international global patents. (18-BLR)
Study product-market fit	I guess two parallel things we are doing. We are constantly interviewing people, trying to find the best product-market fit, the market segment to start with. So, we have another co-founder who is a business person, he reaches out to tens or hundreds of companies a week, and then pre-screen to talk a little bit about if there is any interest. If there is some interest, then we do a second-round interview with them to see like, what are their needs. And then we go back and try to make sense of the data, that is one direction. (08-SFO)

Themes	Quotes
	<p>We have a lot of different ideas on the table, <i>let's go out to the market and really start interacting, do some market research</i>, to identify are people are interested in the concept, is there a need, do we have a <i>product-market fit</i>, if we build this. We did do some studies about how many people have smartphones that majority of that is true US, and you be surprised that how many of this age group have smartphones. They don't necessarily know to use them. (11-SFO)</p> <p>So, I start the interviews, approaching as many potential people from my network as possible. And I just asked what are the top three pinpoints and how they are addressing it now and what's the solution that's available now, and what are they not happy with. I'm at the stage where, I made the mistake of designing the product and building the database before talking to my client. So, for the first five interviews I did, oh, there is no market for it, there's no need, it's not a problem worth solving. And then I realized it's not that the problem is not big enough, it's because they don't trust me. I don't have the credibility yet. (28-PEK)</p>
Market analysis	<p>Based on the research what we have done in an interview, we know that there is some market opportunity for sure. (04-HEL)</p> <p>The research I literally started as researching data, about how many people have a smart phone, how long they spend on the apps, how many people that have a phone actually film videos with it, how many people post those videos. All the data that I could get from video and cell phones about people making videos now. All the data I took that I possible could have. And also, of the trend, how many people ... the percentage of the people took pictures and percentage that filmed about two to three years ago, and the percentage of how many people are taking pictures and videos now. (19-LON)</p> <p>First, we thought we would develop an app that you would download from the App Store, but I might say, one day it might happen, but for now we decided not to do that. We did a market research and we found out, that a lot of people are not downloading new applications to their phones in Israel, just like one app in three months in average. (22-TLV)</p> <p>So, I started by Market Analysis. This is like pre-analysis because I need to go to the market in Africa to check out what is going on there. But here I've started doing the pre-analysis, that is this market. So, I make they the product proposal, I develop the subsystem description, I make most of the subsystem specifications. After I finished that step, now I start looking for the potential partners. Last week I was in Shenzhen, for investigation, I will spend one day for product investigation, so I was learning how difficult this project is, and what you need to make it successful. So, I try to approach some companies and learn from their background. It's like putting pieces together. (25-PEK)</p>

Table 11. User experience

Themes	Quotes
People wanted to use/people love	<p>There had been a similar company in Sweden, but they didn't get the product to work. They've done similar stuff. So, we were not even the first ones in Sweden doing it. But we were the first ones who actually had something people wanted to use. In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work. Maybe one of them had the technology but the UX (user experience) and someone. We were lucky to release a product people loved and when they do start spreading it to friends and family and back on that you can have the organic growth. (02-STO)</p>
First time user experience	<p>Particularly the first-time user experience is really critical to nail, because you don't have a lot of time to explain what your product is to them. (11-SFO)</p>
Simple to use	<p>Going through and he said I have to click on too much things, I don't want to think so much about it. I just want to cook good jam and when this happens. And I don't want to think so much about how to put it in different stages so please make a much simpler formula for a something. And this was very helpful for us because. We thought in a completely different way right. But it is good to get to know this and I am always very happy when I get a feedback. Which tells me what is not working or what is what should be changed. Because yeah, I think this is the best feedback which just says like all your platform is so cool. Doesn't help me to make it better. Than we want we want to make it better and we know that we cannot have it perfect. This is just not possible. (16-BER)</p>

Themes	Quotes
Active developing of user experience	<p>We try to be as lean as possible, and we also have people from the outside looking at our system, whether we need to change the user experience or the user interface, we have people helping us out ... (03-LON)</p> <p>Now we are at a stage of considering whether we will turn our native app responsive, because to do another Android managed different system is quite tough. But at the same time my team is telling me, that because we have a lot of calculations and graphs, that may not be feasible with responsive, because it will affect the user experience very much. So, they are still debating today. (32-HKG)</p>

Table 12. Users, user needs, testing, feedback, user data

Themes	Quotes
Automated testing	<p>‘we tested through automated testing, and through human testing. The developers run the functional testing to see if it’s working or not.’ (17-BER)</p>
Customer feedback	<p>‘We interact with them basically every week. So, we initially started sort of that we developed the idea in cooperation with the customers. We did a lot of interviews to ask them to give feedback of our prototype. All that and now we are still in a situation that we always discuss with the customers of the new ideas and ask them to give us information of what’s working or not before we start implementing thing. That’s the only way.’ (05-HEL)</p> <p>‘customer feedback ... I mean that’s basically it. That’s what has driven development and it is the tech team which uses agile development principles, and practices to decide how to develop certain new features or updates to features.’ (06-SFO)</p> <p>‘At the university I learned a lot from the design centre the user centric design and iterating user feedback, that is something we definitely do (07-SFO)</p> <p>We are doing the UX testing for example, where we can test the service face from the consumer side and receive feedback for that. (15-BER)</p> <p>‘I mean we try to get feedback from users but unfortunately the feedback is very low. I mean we don’t get enough feedback.’ (16-BER)</p> <p>‘We have so many WeChat groups, and every group maybe have 100 people and that they are now our target audience. Maybe we want to find some topics or another video. We talked on this in WeChat groups.’ (31-SHA)</p>
Developing with customers	<p>‘And we are also working with early users, they are constantly giving us feedback, what specific features they want, so we are collecting data to know what our product roadmap should be like.’ (08-SFO)</p> <p>‘From then on we were focusing on getting some clients to develop the prototype with them. And now we have three companies, who are working with us for our prototype. And we want to launch in two to three months. It is important that we develop our platform with companies with the view from consumers, we this now, and we will be doing it in the future too, because we think this is the best way to develop.’ (15-BER)</p> <p>One is a huge publisher, they have two-sided business, they are a publisher and on they generate revenues from ads, they also have a software solution for publishers, which allows them to create polls and quizzes using this software. So, they have implemented our code, so every need that they have to correct something, they contact us, to make sure we are able to do that, and if we are able to do that they just go ahead and log into our platform and they do it by themselves.’ (21-TLV)</p>
Own testing	<p>‘We basically tested with our own bank accounts. We just asked our friends and family to try out.’ (02-STO)</p> <p>‘Friends trying, friends and family, and us.’ (19-LON)</p>
Testing community or focus group	<p>We have organized this kind of a User Club which is like outside of our team but kind of a part of our community to get insight and input into our development. We have constantly an open arena to post improvement ideas. (13-HEL)</p> <p>We have a 50 people testing community now, testing all the time. This is not yet released to the open market. So, every time we are using a new version, alpha version basically, they are testing and giving feedback for it. (24-HKG)</p>

Themes	Quotes
	We will group them together, and we just like we chat with them. It's just like a focus group. Another way is that we talk on WeChat and we also have some questionnaires, and asked them, how do you like our video, and what do you want to tell us. (31-SHA)
Testing in different locations	<p>In Japan, we're testing at the moment, test should be finished August by October it'll be out in Japan. That will be the first, you see what's happened is we wanted if actually the system to be as low cost as possible and that that's been very important for us because people are especially in developing countries if it's high. If it's a payroll system which is a high cost and then we not use it. That said we want to make it as low as possible, with partners and open source as well. Before that, we're doing a visit to India in August. We see it is it's important to know the local market and we want to get developers in India as well, who know the local market. So, we look around India because we need different language versions of service. (03-LON)</p> <p>And then we went out and methodologically got tested in various market places to see whether we were getting acceptance and support. (11-SFO)</p>
Testing with key stakeholders	<p>We studied what the competitors were doing, studied their process and we boiled down the key elements, that deliver most value to our customers. Then we write down the offer and send it to our customers and validate that in real life. We don't do any demos, we don't do any beta testing, we do beta testing in real life (01-HEL)</p> <p>we reached out 100 -200 key stakeholders we thought would be important in Sweden. And that could be anything from tech bloggers to security experts. So, we talked to them via email and invited them to the beta, and this is who we are and feel free to ask any questions etc. And then we also built the beta community for end users to sign up to try out this service before we launched. So maybe we had 1 000 of those before we launched. So, they were great ambassadors. (02-STO)</p> <p>(03-LON) What we do is this might be the right solution and then we ask a lot of people for advice as well.</p> <p>INTERVIEWER: Who do you ask for advice?</p> <p>It could be anyone from either the governments or it could be people in the U.N. It could be like the researchers and topic and the main thing is for us is we need to try the model like is everything what could potentially work in theory but we need to also keep trying. So actually, we put something out there, if it doesn't work we go back and then we actually iterate the process and then try and move on. And it's out there, what's worked in Japan might not always work in the other countries. (03-LON)</p> <p>And they were purely engineers they had concepts and they were building things, but they were not checking with the market, whether this was something that was needed. (11-SFO)</p> <p>The first thing we did, was to reach out to, ambassadors we call them, they are people with right background, they are in this country, and they have a lot of contacts there. We try to get them connected to the project before we even start. And to reach out to test users, for instance if we are going to Vietnam, we started with one guy, who lived half a year in Vietnam, and half a year in Sweden and had some business there, and who we knew personally, and he introduced us to more people. (14-STO)</p> <p>So, we had a pilot at November 2017, and we started our pilot in Tel Aviv city. We asked the people who were volunteering to the traditional program to bring one more friend, because we wanted to expand it. And then in the meantime we published our help line number to more elderly in Tel Aviv. And since then, until we launched the app, we did like the growth step-by-step, as we published it to more elderly. (22-TLV)</p>
User data	<p>We don't have a rigorous system in place here for data collection itself. So, I said we have three different stakeholders now. (27-PEK)</p> <p>'you got some basic information but most of the time you have to use humans to get to understanding your clients, your customers through the social network' (29-SHA)</p>
Number of users	<p>'400 000 in Sweden.' (02-STO)</p> <p>'We have 5000 users in Berlin, Hamburg and Munich.' (17-BER)</p>

Table 13. Value related talk

Themes	Quotes
Lowering costs	<p>It all boils down to giving access to our competition platform, if they would do that alone, it would not be <i>as cost-efficient</i>, then using our platform. Also, I would like to think us as experts as doing challenge competitions, so gaining that experience is the value. So, the question is should you organize your own party or take part in a bigger party. We add elements to our service that are not easy to organize by private small companies. (01-HEL)</p> <p>I was going to get into was better analysis and <i>cheaper prices</i>. Okay, so the first part is that standardized product allows for much deeper, because it's analysis is no longer a personal consulting. And the second part is that it is very price friendly especially for medium and small businesses. And the second one is to have better analysis because when you're consultants, people are prompt to human mistakes. And honestly, we can't track that much information, so I noticed that the analysis that we give to our clients are not the best. So, leveraging technology I wish that I can provide better policy service as well. Well that is the value proposition. (28-PEK)</p> <p>What we offer to an event organizer is that <i>we are at least half the price</i>. So that's the competitive advantage so we are cheaper and we still remain retain the same accuracy and even better, because in the feature we want to build a platform to connect interpreters with event organizers. (27-PEK)</p>
Safety	<p>I am giving them the ability to store their memories on a safe place, and private if they like, cause it's like I said, if it is vlogging of their kids growing up, can just put their vlog private and share it with their families. I am giving them the opportunity to store their memories safely and to go back in time and if you like in the future go back in time and relive the memories for free. Because they are not going to pay for the service. (19-LON)</p>
Customer need	<p>Through the providing them services what they want and need. So as long as we are close to them, are able to answer their needs we are bringing value to them. (05-HEL)</p> <p>We give our customers the opportunity to get fast and direct feedback from their clients, in addition they have experience of their product because when you have a beer and you can have feedback on the moment you drink and have the experience of taste maybe. (15-BER)</p>
Simple to use	<p>We solve two basic problems, the first is that <i>we make it simple to have</i> multiple bank accounts, so that has been a problem before, cause you kind of need three or four different web services to log into and now it is all of a sudden one and it is not only one but you can get that holistic picture instead of getting some assets, some costs, or income, you get the whole picture. The second one is we do a lot with the data to help the user to understand her finances. So instead of having tons of transactions, we categorize 90 % of all the transactions and when you have them categorized and cleaned up and transaction descriptions are nice etc., then you can start to do cool stuff about it. Those are the two main values. (02-STO)</p>
Quality of service	<p>The value that the customer will get depends on one side is <i>the quality of the service</i> it will provide. But I just take an example, as we work, we have a production and post-production companies for the making of documentaries and stuff like this. And the video editor has been able cut his editing process by 2 by using our software. (33-DUB)</p>
Save time	<p>INTERVIEWER: So, you thought there has to be a solution for this?</p> <p>With our solution what we have created, we could have done it in about 30 minutes tops. (21-TLV)</p> <p>Well my customers are B2C mostly. Of course, we have some business clients as well. I would say you see probably <i>saves them a lot of time</i>. They don't have to do their research about different products, different cosmetics or clothes. And this person can provide them with more professional opinions of how to make yourself look better. (29-SHA)</p>
Earning value	<p>the value pyramid of mobile, we started with where communication was the value, then we jumped into smart phones, let's say that the online shopping aspect and gaming, and social entertainment aspect became the value. If we want to kind of compete in this area, we need to jump on the next level. You cannot compete on the same value level with the existing players. The next level, the only thing I can imagine is that <i>you start earning value</i>. (24-HKG)</p>

Table 14. Scaling and growth hacking

Themes	Quotes
Looking for growth (growth hacking)	The different segment actually. We first offered it to different advertising companies and started working there. But then we started to think where can we deploy it in other areas, and we decided we can go wider, not only advertising. But now it is pretty popular among advertising. (20-TLV)
Targeting scalability in development of idea and business model	<p>And now the next step it depends on our growth appetite. It depends on what is the product market fit, if we find that the product market fit is online SaaS product. So, then it should be scalable just by adding more money to advertising and more money to making tempting materials and you know and stuff like that. (#13)</p> <p>Now we only take the premium fee. Also, for the conversion, it is much better. It is also much better for the scalability, when you have a business model that are not reliable for them. (#17)</p> <p>One of the things is the frictionless, now we have a completely frictionless system, we can scale out, nobody can limit the scaling. People just send the value. Earlier with our former company, it was very complicated to scale. And that seems to bring a lot of traction from operators and other large companies, they are missing this kind of tools. It remains to be seen, but if we get really them buying this, we get their user base to scale this. (24-HKG)</p> <p>But also, the system, that I am trying to design has the scalability, because in Africa will not stay in the same stage ... to getting the growth and develop, so we can add those functionalities later. (#25)</p> <p>So that brings a problem is that our business is not scalable, so we think that we need to make a new product that is relatively standardized, that can feed different needs, different demands. Like we are considering to make series of courses about entrepreneurship, and because we have overseas resources. (#26)</p> <p>So, we need to get a couple of technologies out so we are working with this kind of couple of scalability problems. One of them being the connection problem we have in certain events. We are working on that. (#27)</p> <p>Yeah, I think two things. One is more on the backend, how we deliver to our clients. So, clients might not feel the difference, but I want to create a standardized product and make consulting scalable ... (#28)</p> <p>But we don't want just to be an e-learning classroom, because you want the teacher to carry out the lectures, we don't play any part in it. And the most important is that it's very scalable and affordable so it could be just as cheap as 10 to 20 USD or yuan. You can have access to the whole suite. (#30)</p> <p>In the past few years I would say this is the thought, first time to lay down the foundation, because we have to build something very scalable. Thus, the time that we build the foundation is much longer than the other start-ups. But once this foundation is built, the good thing is, the entry barrier is very big. So, this first thing that I think is good. (#32)</p>
Community scaling	Then the second this in, that we need to get community scaling. I don't think that any start-up will scale without a real community. And that means that we need a kind of early community, in a scale of tens of thousands of users. And then in order to really scale, we need to sign in some very large operators or device manufacturers who will license this solution. (24-HKG)

Table 15. Role and meaning of platforms

Themes	Quotes
Used for advertising	<p>I am picking on Facebook, I could pick on YouTube, I could pick on Snapchat, or Google. I could pick up on any of them that's driven by an advertising acentric model. They have a lot of information, Google more than Facebook has more information about us, than any other company on the planet. (11-SFO)</p> <p>Well of course I mean when trying to make a connection to your potential customers, so then all these platforms like a social media LinkedIn and Twitter and email, they are used ... I think we cannot survive without digital platforms. (13-HEL)</p>

Themes	Quotes
	<p>So, for the WeChat ecosystem they have a public content thing. So, the public content provider can just be purely a content provider. You can think it's a version of Facebook post or Instagram instead. Instagram with a lot of contents. It's like a blog. Similar to a blogger. (29-SHA)</p>
Backbone, business built or based on platform(s)	<p>I think that our whole business is based on utilizing digital platforms like Amazon or equivalent ... we are using S Q L databases. I don't know if that is exactly a platform or not, but that's like a technical solution. Well then of course for the online purchasing we are using Stripe which is a payment platform, it's a digital payment platform, and it's integrated into our application. Then for the customer stickiness and also for the customers, before they come to our customers, we use HubSpot. HubSpot is like marketing automation platform. (13-HEL)</p> <p>The whole business is on digital platform, so they are the backbone today. Huge. We built a digital platform, it is a part of our idea. Of course, it has a huge importance. There are a lot of web platforms out there, Facebook, Instagram, SAP. (18-BLR)</p> <p>I guess in many ways digital platforms were a huge part of my ideation, if they would not have existed, the entire industry behind them wouldn't be existed and my idea would not have been possible. (21-TLV)</p> <p>Our solution, it's built on a platform. We recommend certain products in the blog and then through the blog the link directs to the eStore. You click through the article and here there's a link directly on the article. It is like infomercial or white paper. Think of WeChat as another version of App store, so you can build your own app embedded in the WeChat system. But it's not like a full gown app, it is more like a Web site, JavaScript based. The eStore is also in the WeChat system. (29-SHA)</p>
Cloud services	<p>We are building on AWS. (07-SFO)</p> <p>We try not to, we are currently completely based on Amazon, we use Amazon services for that. It's pretty easy to get stuff up and running, using this ready-made platform. Our platform is implemented on top of AWS (08-SFO)</p> <p>We use AWS, which is cheap (09-SFO)</p> <p>Everything works in a cloud in Amazon somewhere in Europe. (13-HEL)</p> <p>The blockchain itself is a cloud service itself, so that is definitely a cloud service and then we have our own databases as well, that we use for our backend solutions, and then we use APIs, a lot of our partners have solutions that are APIs, so we try to do that, and we work with licenced partners, for instance financial institutions, bitcoin institutions in other countries and we typically connect to their systems through API protocols.</p> <p>Interviewer: Amazon Web Services (AWS) do you know that?</p> <p>Yes, we actually use them as well, we use it for things like sending out SMS, presently we are using it for two factors, basically you are logging in with password and we use Google authenticator, right now it is SMS based, and we have some other things that we run on backend on service that they provide., so are using that as well. (14-STO)</p> <p>The database is behind the platform, otherwise it wouldn't work. I cannot give you more technical information because I am not the programmer. I only talk with them and they inform me when they have new results, and I can test them. And we talk about how what functions do they have. We are collecting the IP address ... (15-BER)</p> <p>We are using the AWS as a provider for the infrastructure, I am used to Google services, it is very similar to AWS. With my previous services I was using the Google Cloud. (20-TLV)</p> <p>We are using Google Cloud, Mongo, WordPress for our website. (21-TLV)</p> <p>We use Cloud, originally, we had own development servers, but we moved to Cloud immediately as it was possible. Cloud was Cresco. (23-HEL)</p> <p>We're using Heroku but it's a platform service based upon AWS. So, we took this kind of platform service because it makes our life a lot easier. (27-PEK)</p> <p>Yes, I use AWS, but I will also use Ali Cloud. (28-PEK)</p>

Themes	Quotes
	Right now, we are in Digital Ocean. (30-SNG)
Used for communication	Digital platforms, I can use it in my work, for example even WhatsApp. We use it for the work as well, we are all the time chatting there. (20-TLV)
Used for development	<p>I guess everything. Because the tools and the data we send is often send through digital platforms like Google Ads and Facebook. My clients are buying media from these platforms and in order to optimize their media campaigns they are sending user engagement data from the website back to these platforms. I guess in many ways digital platforms were a huge part of my ideation, if they would not have existed, the entire industry behind them wouldn't be existed and my idea would not have been possible. (21-TLV)</p> <p>WeChat is an app which is very popular in China and they have like little Apps. I can show you. The little app is very easy to develop. It's not expensive and it's very cheap. Normally, if you need to start like you said the digital e-learning course you may need to develop an app, right, the mobile app, but now you only use WeChat as a platform for courses, it's much easier to develop. (26-PEK)</p> <p>Huge. That you use Toutiaou platform all the time. And that's a digital platform. (31-SHA)</p>

Table 16. Platform as an outcome, development phase

Themes	Quotes
Community building	<p>And then we also built the beta community for end users to sign up to try out this service before we launched. So maybe we had 1 000 of those before we launched. So, they were great ambassadors. (02-STO)</p> <p>We have organized this kind of a User Club which is like outside of our team but kind of a part of our community to get insight and input into our development. We have constantly an open arena to post improvement ideas. (13-HEL)</p> <p>We actually didn't raise anything until we realized very fast once we started with crowdfunding project that you can only be successful in a crowdfunding project when you already have a community around you. This is what we didn't know before. At the moment I still would not try it again. I think I would wait until we have a more stable and reliable community. The good point within this time was we started getting in contact with people that had more knowledge about start-ups and that have more knowledge about food community. And we were just started talking with people and realizing for example this with a crowdfunding project only works when you have your community already there. And she for example she told us call it's community marketplace, because it is not a marketplace which is ... She advised us to focus on this community because the target audience is quite interested in being part of a community. It's not only about buying and selling and that's all. She said, don't focus so much on this product, focus more on the whole environment around, like focus on the people that are would buy a product. And if you have this whole environment then the products is what you make money with, but people don't like you because you can get money from them. They like you because you show that you are part of this whole system, the whole community. I would say building the community which is probably the most complicated thing (16-BER)</p> <p>This is very much a platform. This is a platform rewarding end users for online shopping and community engagement. And this is also a platform for applications to provide their services and rewarding their community. Then the second this in, that we need to get community scaling. I don't think that any start-up will scale without a real community. And that means that we need a kind of early community, in a scale of tens of thousands of users. And then in order to really scale, we need to sign in some very large operators or device manufacturers who will license this solution. (24-HKG)</p> <p>We work towards that direction, and at the same time we are doing other things like financial literacy, and maybe chat room forum, building community, building learning community etc., improving the education tools etc. Maybe making this financial product education more available to other South East countries. (32-HKG)</p>

Themes	Quotes
	<p>We arrived at this final product that we have currently on our website today, which is the first crowdfunding platform that is financed by the brand and activated by the community. And this is completely unique. It's the first platform in the world where people can microfinance a project and with nothing to pay, with no credit card, it's totally free. (34-PAR)</p>
Market place, two-sided	<p>It's a service. From the client side it is an app that they use, we want it to be really simplistic, so there is a log in, you can find the exchange rates, and you can send transactions. (14-STO)</p> <p>We are a B2B platform, but companies are using it for B2C. We develop platform B2B and B2C, we care about the business side but also the customer side. It is important that we develop our platform with companies with the view from consumers, we this now, and we will be doing it in the future too, because we think this is the best way to develop (15-BER).</p> <p>We actually are the digital platform. And in using the platform for different purposes. So, like think they hit the idea OK they because they have something like as this small beer breweries or so and they said yea we could use your platform for these beer breweries but then we need to change things of the platform and maybe like we can develop together with you the platform or we can change platform a bit. And but we decided let us not do it because what we want to do is not simply building a digital platform, which we can make resell. What we want to do is we want to build a business. Just because we said if we would do it, we would mostly spend time in helping some guys to maybe make their business big, and we cannot concentrate on our business.</p> <p>It's a marketplace, definitely. And she for example she told us call it's community marketplace, because it is not a marketplace which is ... (16-BER)</p> <p>We basically put a platform, that has not just one vertical, how it is usually done. We have so many verticals, basically one account for all jobs, and also it is connected to push notifications which notify you when there's jobs close to you or around you. And that make it like, for example if you go from work to home, and someone needs something from the grocery store, you get a push up notification on your way home, and you can grab it for him and make some money while working home basically.</p> <p>Market place for services, the vision is that anyone with any talent can come to our side and monetize his talents.</p> <p>We are a digital platform, we were thinking that that's the future, and we need to be in platform business, which enables people.</p> <p>INTERVIEWER</p> <p>What sort of platform are you?</p> <p>17-INV-BER-20180511</p> <p>Market place for services, the vision is that anyone with any talent can come to our side and monetize his talents. And that person who needs something, whatever services it should be he could find it on our platform. Like if you see a little broader, like starters, student usually now, we get their full profile and then we want to cater them during their whole life time. Once they have had a couple of jobs, finish their studies and looking for real full-time job, and since we already have all their information on their profiles we know what they are doing, we can cater them full time jobs, which are like head hunting paying really well for us. And we can complement the whole offer for businesses as well. And that is also great for us. (17-BER)</p> <p>Volunteers, the elderly and social workers, three dots in the circles. Basically, the more ... the new thing about the platform for the new generation, is how to do the volunteering in an innovative way. (22-TLV)</p> <p>You know, really general sense we are a content provider. As for where we are kind of stationed, we are somewhere in the crossroads of podcasting, streaming and translation. Because we are live streaming but we are also saving. So that is like we are where we are stationed in the market. Yeah, I think it is going to be a light podcasting translated platform basically. (27-PEK)</p>

Themes	Quotes
	It is about a one stop platform for trading financial products, also including option, structured products. (32-HKG)

Table 17. Ecosystem as an outcome, development phase

Themes	Quotes
Technology base (block-chain) and an application ecosystem	<p>We have now created the identity, universal wallet, so I can now send, if I have your WhatsApp, I can send you value immediately. Basically, you don't have to have my application or anything. You just have to have WhatsApp, Messenger, any other communication method, email, and I can send you value. And then the reputation score is something we need to build together with other companies.</p> <p>This was a high abstraction level. If we go a little bit lower. You can imagine like Android nowadays is a web tool operating system. It's powered by everybody's phones, or IOS similarly. And <i>those are closed ecosystems</i> in a way. Google and Apple are basically the taxation parties there. Now what we are building is a free operating system, it is decentralized by nature. There is no one taxing party there. In a way the economics is different. And what is our role is to build a good user experience on top of this quite raw technology base, like a blockchain and multiple other emerging technologies. Similar to what Linux was to operating systems and Android was built on top of it. To build a good experience and an <i>application ecosystem</i>. (24-HKG)</p>
Educating of financial products as financial instruments (a special subject/theme)	<p>Basically, we are like we haven't started on anything like the TLT or the blockchain yet. We can start this blockchain technology, but just that we haven't thought that to be essential for us, I must get our business model to slot this into <i>our ecosystem</i>. We don't want to do something, which is because we need the blockchain with a sexy name, and inserted into our system. We want to do something which is in demand and useful. So, if you ask us, at the moment, we are focusing on writing apps, and we have written an IOS app. So, this IOS app, if you just look at, it is just giving you prices of listed options. It doesn't look very different from, you know, maybe some other information vendor software.</p> <p>But what we are subtly building, is for example we have an AI moving ..., we called a business intelligence moving buffers. So, our moving bar, unlike the other moving bars which are showing you the raw data, or, you know, what their stock prices, actually our moving bar has built in calculations. That was part of some calculation such as the most traded listed options in Hong Kong in real time. So, we need to get that all that rise of the options, portfolio adding together, then sort it, and then rank it.</p> <p>We are at a stage of considering whether we will turn our native app responsive, because to do another android managed different system is quite tough. First of all, it is not that easy to get real time data in Hong Kong. You really need to be in this industry, and know the vendor to get that data. And also, it is a bit costly to get data right, because we are getting data from exchange. And there's some work to do that and complications.</p> <p>And then secondly the instruments that we are doing is an option derivative, which is quite a tough instrument. It is about a one stop platform for trading financial products, also including option, structured products. And structured products can be anything like equity thing docs, things which are made of the different derivative instruments. I find these financial products are being misunderstood by a lot of people and a lot of people find the evil or don't understand about the instrument. And I think there's a need for education, a lot of people they do not understand it. And in fact, this can be a product, which can help you to hatch your portfolio, to minimise the risk, to make you more mature in managing wealth. Unfortunately, a lot of people don't understand and use it wrongly. They use leverage to do things and then hurt themselves at the end.</p> <p>People have a wrong impression about them, oh I'm very afraid, no better not touch it. But not touching it, is not the right attitude, the right way to face this problem. And if you look at how big this financial products' market is today, it is of 550 trillion U.S. dollars, maybe. Which is much bigger, I think the double of the size of the whole world real estate market. So, there is a need that there should be someone, or you know even the government, or some regulator trying to improve the knowledge of the general people. (32-HKG)</p>

Table 18. Future

	Themes	Quotes
GROWTH	New markets (B2B, geo-graphic)	<p>The next thing is to contact a lot of companies B2B. Sales is a big topic. We have to have more people to work for us. Sales people and programmers are the next people we need. (15-BER)</p> <p>We would target to reach 1 million boxes in the next three years, and which we are going to in India alone. And not only India, maybe within two to three cities of India. And India alone we have is an easy potential to do three to four million boxes. (18-BLR)</p>
	Going international	<p>The other thing will be to make our app international, the opportunities that will come from abroad. We already heard that some cities around the world would be interested in it. We should have it in the App Store. (22-TLV)</p> <p>I see many different scenarios for my future. As for this work, I want to build it, I don't want to sell it. I want to expand to other markets and I want to work for it, the next 10, 20 years. So international development is my core passion, but that doesn't mean ... that there's a lot of flaw in there. And I don't think to change that international development, like it's inefficiency. I don't think changing it from inside is the way to go. I think you should disrupt it from outside and you need to have the power the money to do that. And that's one of the drivers for me. So that's the worst scenario and the best scenario of course. The middle scenario is only semi successful, but I wasn't able to standardise the product. So, then I just sell the company and I get some money. I think about what I do next. (28-PEK)</p>
RAISE FUNDING	Raise funding	<p>So, if I get those points together I can raise money at the summer time that helps us pour gas on the fire and the fall, when students come back and say Okay so are going to go get 50 universities as opposed to five. I'm just trying to get a couple of universities up and running right now using the product and getting the data points to us. There are tons of product milestones baked in there but in the major ... we run by objectives at all times in the company so we have our strategic objectives to prove the success points of the product. And sometimes various things, were a little bit behind in our IOS product. There's all kinds of magic that has to happen there so there's product level objectives, adoption and traction level objectives in the market. There's the go-to-the-market perfection model. So, in order to go raise my series A, what those venture capitalists want to see. I know I have to do A, B, C, if I give them A, B, and C they are willing to give me D. (11-SFO)</p> <p>Funding is a big topic for us. We were in a lot of meetings, bootstrapping and with VCs. We think we have the possibility of bootstrapping, because we can code ourselves, and we don't have huge costs. But with an investor we have more opportunities and we can grow faster. Hopefully we have partner who can open doors for us. (15-BER)</p> <p>We are doing the ICO, approved the basic BUFFIN, or kind of like a disapproval but we need an approval, this is what you have to do in Germany. It is like the financial authorities, they have to approve that our coin is not a security token, you are in the same sphere as an IPO (initial public offering) and we don't want that clearly. We need a disapproval that we are not like into this sphere and then afterwards, it goes forwards to marketing, and actually you are raising the money and implementing the software to make it possible for payers to use our own token on our platform. (17-BER)</p> <p>I keep on trying to bring in investors, and after that it is just focus on user growth and user engagement. (19-LON)</p> <p>Raising funds as soon as we get the first paying customer. (21-TLV)</p>
	Exit and found new companies (serial entrepreneur)	<p>went on to co-found few other companies. (23-HEL)</p> <p>I am going to sell the business soon, we probably get bought in the next three months. I hope I don't stay. I think it would feel good to have a win under my belt. I would like to have a lot of money so I would not have to worry about my future. I would have a lot of money to be able to save enough for where I can be working 20 years on something out outrageous, that has a small likelihood of actually working. But if it did work it would be huge. Whereas this company now is pretty safe. We are going to grow revenue two to three times every year, and then it will slow down, we might get 20 – 40 million revenue</p>

	Themes	Quotes
		<p>per year, but I don't see how it can be like a billion dollars a year revenue. And that is the real goal. This is a stepping stone to get there.</p> <p>If I sell this company now. A lot of investors will look that I am able to start and scale something very quickly. So hopefully they would trust me to fund something bigger. And also, I don't pay myself a lot of money now. So, it would be nice to have money stacked somewhere so that I wouldn't have to worry about it ever again. (09-SFO)</p>
	Monetizing and business model	<p>The most important for us now is that we start monetizing user and when you do, all of a sudden that kind of unit economics works out, you can start calculating how much a new user is worth, how much can I monetize it. And as soon as the value of user exceeds the cost of user with one cent basically, then you have a money machine. And then you can just scale it. So, we haven't done that. We operate only in Sweden, we have prepared for a number of countries in Europe, but for us the most critical thing is whether we get that equation to work or not. And if we do we are going to more growth mode I think, now we are more like experimental or try out mode. (02-STO)</p> <p>The first is the business model, I want to make sure we are choosing the right way, and we are looking at all the options. (22-TLV)</p>
	Risks	<p>There are so many risks, everything from competition to security risks. Banks want to f..k with us to how do you deep customers, do you really get them to pick financial services through our solutions, and keeping them happy. If our company is not successful, then we probably have to raise more money. And if our company is successful, we probably have raised even more money, because then you want to scale it faster. So, funding is a risk always. Now we have a good funding market for many years and it might change. I think, our company can turn out to be fantastic or it can turn out to be very mediocre. We don't know yet. And that is kind of what's interesting about this, if you are a big company, what I am doing is not going to make any difference, and here what everybody does makes a huge difference. That is really rewarding to work at this place, when you don't know what's going to happen. (02-STO)</p>

Table 19. Macro-level moderators

Themes	Quotes
Laws and regulations (EU-GDPR)	<p>And second, most important was, how big are the flows, are they significant enough for this. It was also because we wanted the test setting, the proof of concept. So that's the part of the reasons we went to these countries and build the networks there. And it took some time. We didn't think so much about the legal side, because we were thinking we were just going to be the intermediary. And then, actually, the place where got into a little bit of trouble was in Sweden, because we had one bitcoin exchange firm here we were working with, but they had some problem with Finansinspektionen. Both the tax authorities and Finansinspektionen and the banks in the developing stage of blockchain industry, they haven't been all that helpful to bitcoin exchanges even in Europe. In the financial industry there are different regulations in each country making it difficult to build a solution so, we need to work with different countries, so the blockchain is typically not regulated in that fashion, so you can send bitcoin transactions, as long as it just bitcoin transactions between users and the users may physically be in different countries, but they have a wallet and you can send funds between them. We have partners and the minimum requirement is that we are ourselves uphold the standard or they cannot work with us. So, if we are familiar with the legislation and we can just follow the necessary procedures without obtaining the licence ourselves, and we can work through licenced partners. In each country there is someone who has the licence, and they will take care of the change and take care of the cash flows in traditional currency for us, and we don't need to do that, and we can skip this part. That didn't work out, because it was difficult to find enough (14-STO)</p> <p>The data is stored in the at the moment in the mainstream database and it is prepared in the way I cannot tell you so much about the details. Yesterday as I was working about this topic with the EU wide data privacy regulation. I would say we are fulfilling the regulations in every aspect. Our idea is to promote transparency. So, we should also provide transparency about the data and we are very sure that sooner or later I mean it is in some way it is already written in these regulations but sooner or later. In your in your account on our platform there will be a page where you can see every data that we know about you like you have one page where you see this is everything that we know about you. And then depending on the how it is working from a data perspective or from</p>

Themes	Quotes
	<p>a data integrity perspective you can even choose to say OK I want to delete this. I want to delete this and I want to believe that. So that we say we have we are already prepared. To a regulation where I am sure sooner or later it will come because at the moment what is written in this regulation is that every person has the right to ask every kind of company that you were in contact with which kind of data do you have for me. And you can even you have the right to ask them to delete the data as long as it is not needed for this like tax purposes and something. (16-BER)</p> <p>INTERVIEWER: What about the EU data privacy act?</p> <p>(17-BER) Of the infrastructure that we are using, people have to opt in, like cookies and stuff, but we already also did that, for us it was mostly minor changes we had to do to the system, that no big deal.</p> <p>INTERVIEWER: You are complying with the regulations already?</p> <p>They can manipulate the data, or delete or whatever, both is possible (17-BER)</p>
<p>External competitive environment</p> <p>(see also Critical events Table 5.19)</p>	<p>Now that Apple has told us that our market is dead. They basically rolled over us and crashed our market. What do we do? And in that situation, we actually fought it initially, which was we had a bunch of customers who were big Apple partners. (11-SFO)</p> <p>The failure of Nokia and in that sequence. The failure of Nokia not was particularly devastating for us because we have developed our B2B platform on Nokia's Symbian devices and we leaders, and our road map would have integrated our solution directly to Nokia and have preinstalled 200 million devices globally in 2000. And then Nokia decided to let Symbian go and our strategy went down the toilet. (23-HEL)</p>
Technological advancements	<p>Blockchain (24-HKG)</p> <p>FinTech (02-STO)</p>

Table 20. Firm-level moderators

Themes	Quotes
Vision/mission	<p>we define our mission to democratize opportunities. It means that free information flow, education flow, capital flow in the planet, no matter where you live. (24-HKG)</p> <p>And how we get income but also trying to understand the vision that where we think this should be going. We already had the vision, and you know, in May. Before May we thought we had the vision straight. (27-PEK)</p>
<p>Founder team</p> <p>CTO</p>	<p>The second one is to find the CTO. And that is just out of my control. I don't know when I'll meet the right candidate. And the third is fundraising. And the fundraising part is very closely tied to finding a CTO, because I always get asked who is your CTO. We trust you, but there's only you and that's not a team. So, I feel like even if I take my time with finding the CTO, the VEs don't wait. Yeah, they're quite impatient. But I am going to be careful with that, I agree. (28-PEK)</p>
<p>Networks</p> <p>Relations with regulators, international organization</p> <p>Industry ecosystem stakeholders</p>	<p>'For us it is important to have close ties to regulators. I am actually assigned to leave in 7 minutes, because I have a meeting with Financial Service Authority ... Those are one of the key stakeholders for us.' (02-STO)</p> <p>'It could be anyone from either the governments or it could be it could be people in the U.N. And as long as we can keep talking with the right people, they want to make a difference. There are social issues at the moment and then it's a lot easier for us to get the buy in and convince them and make it legitimate effectively.' (04-LON)</p> <p>'And because when I was with the exchange we have different missions. I can't put all my time just on (developing) this and I have to do other things like regulatory, maybe talk to the SFC (Securities and Futures Commission) on other stuff.' (32-HKG)</p> <p>'Otherwise you would start looking at where do we have the biggest flows, and you would start trying to enter those markets. But we did it the other way, we started by seeing where could we find the connections that could help us to build connections for these countries. And we used social media for that so, I could ask my friends friend on Facebook or WeChat of something, my other channels if they knew someone who knew something about the banking</p>

Themes	Quotes
Start-up communities	<p>industry in some Asian countries. And there was a friend's friend, and he knew someone, who was from Pakistan and his uncle was in banking, working with a central bank, and the uncle could introduce us to some people. And then in turns we could find the bitcoin scene as well. You network with a lot of people, and they introduce you to some other people, and in this way, we could find the contacts that could help us to understand both, the technical side of it, the legal side. And also, that could get us in contact with people who were sending money from Europe to those countries.' (14-STO)</p> <p>'And then we started growing from that. So, we are now working with StartUp Grind. And we are now working with a lot of these start-up communities, WeWork and so forth. There's a lot of interest from that because it's naturally international community and they are interested in our solution. So that is like the entry point, the actual start-up community itself that got us the first kick and boost to get the recognition and get the people to believe that we can do something.' (27-PEK)</p>

Table 21. Micro-level moderators

Themes	Quotes
Start-up mindset Risk-taking Delayed traction	<p>'The thing that I learned the most from all my previous businesses are patience. One hundred percent, like I am the guy always that wanted to do myself and I always wanted to do it quick. And all the other businesses taught me I need to wait. For you to do business as I am doing now, is literally investing in your future. You are not going to see the results quickly, it is not like you are opening a restaurant and you are doing marketing and in one month you see income coming in and you're set. On app, you launch the app and it can be years before you see some traffic and then you need to figure out how you are going to make money with that. And then it is like completely different scenario that I literally have to pass all those businesses before to get to what I am and what I am doing at the moment.' (19-LON)</p> <p>It's quite complex situation when you are especially building something, which is not existing yet. Although it is extremely painful to have an iterative approach, I think it is necessary for success. As a probability game, if you are building totally disruptive, your probability to succeed is like, ok, we decided in the beginning that we decided to solve this problem, and will work next two years to solve that, the probability to succeed is less than two percent, I think. Because you just don't know if that is the right direction. That is why, if you have an iterative approach you can manage the probabilities and survive. (24-HKG)</p>

Table 22. Entrepreneurial learning

Themes	Quotes	refs
Need to develop faster (extracts)	<p>invested more in developers, launching fast</p> <p>having more money help to proceed faster</p> <p>tension of moving fast but also slow enough to learn</p> <p>make prototype earlier</p> <p>make prototype differently</p> <p>be less quick and dirty, me more organized</p> <p>ICO earlier</p>	7
Feedback	<p>It is a good experience, it doesn't really matter which ... you have an initial idea, it needs to be in a face where you just start to talking to people and validate the idea, like, I think it is progress regardless of whether people agree with you or not. We had to pivot, I see that as a progress, we could have it earlier, but I think it is also, there is a necessity having people telling you negative things or deriving negative conclusions from how people behave to understand how you should pivot. And it is always tough to say, is this too early to pivot, or have we had enough evidence that we want to do something different. It is hard to say if we can reach that point earlier, I guess I am reasonably satisfied with how fast, or the speed which we decided to do different thing. (08-SFO)</p>	2

Themes	Quotes	refs
	Especially, you kind of think, we have a good idea, and funding from the start, but when you go on in there, and you try to convince investors, and you think okay, we have the proof of concept, it will be enough, we have this, and it will be enough, you really need to have a large number of users. It's difficult in this business, because you have all the regulatory things to prevent you from reaching users (14-INV)	
Focus on the things that matter	<p>Knowing the things, we know now, we wouldn't have spent as much time on things that in the end didn't matter. So, we for example spent a lot of time say we wanted to increase retention, people coming back to the app basically, and we did a lot of experiment doing small tweaks. So, you needed to do bigger things, you needed to develop the product so much further. You would have probably saved a year doing that, and we could have saved a year if we knew that the EU legislation was to come, we could have prepared for that earlier, and then we probably shouldn't have spent half a year preparing the US. We could have probably cut the time in half if we had known everything. (02-STO)</p> <p>One thing that I did, I started talking to investors very early. I don't think that was necessarily very useful. Because I was told many times that I was crazy and that it was impossible, and that sort of things, and I found that it's only impossible for them and for the people that they know, have ever seen that before, and I was not an asshole like Steve Jobs and I am more of a nice person, that is not what a leader should be. So, I'm not the typical 50 or 60-year-old white guy, and that's part I didn't realize would play such an impact as it has, but it does. Just working with more with the idea. I think I probably wasted a lot of time in meetings. (07-SFO)</p> <p>I think there's a lot of things about but like you said like you said you've built an entire working thing and you realize that the foundations that you built upon were incorrect. I think that's a big thing. Would just probably waste a lot less time doing the wrong thing because we know what the right thing is. Sure. (12-SFO)</p> <p>A product is very simple now but it could have been even more simple like really really really really simple. I think it is the simplest what I have seen so far, but it would have been still more simple for the participant and for that for the admin or for the leader. (13-HEL)</p> <p>With the knowledge that we have now I would say this whole crowdfunding stuff we would have left. Because no we know how crowdfunding is working. And this would have saved us like three months, we could have been three four months faster without this crowdfunding stuff. (16-BER)</p> <p>So, I think often the problem was like we wanted to get something done and because we want to well, to polish make sure like you know like we had a good code and that's always spent too much time on things that could have been quicker we are not very evaluating all important was a feature or importance wasn't development. (33-DUB)</p>	6
Good team	<p>But if I would start all over again I would even more effort on finding a good team. I mean it sounds like a cliché because I everyone is saying that how important a team is. But actually, it's these challenging times when really you have to have the persons, that are capable of delivering and are sort of people that you like to be with. So, you can create a relationship. So, I would put more effort on that. (05-HEL)</p> <p>I made some hiring mistakes, but that was inevitable. (09-SFO)</p> <p>Personally, I think definitely getting teammates sooner is something that I wish I did. (12-SFO)</p> <p>We should have kicked the third co-founded out earlier. We had struggles to kick him out, because he was our developer and important part of the team. We definitely should have kicked him out earlier, because we lost a lot of time. (15-BER)</p> <p>We were trying to find people, and finding people and one to the Chinese. She joined us quite early on as well. So that helped us a lot. So, it's of course we will need more resources like more people developing more people doing things. (27-PEK)</p>	6

Themes	Quotes	refs
Marketing	would have spent more money on marketing, because we are doing it now, and it is incredibly profitable. Every dollar we spend on marketing we make five dollars back in revenue. (09-SFO) On the business side maybe going more into like before.... because we are like very very product focused people, we tend to not push too much in terms of sales and marketing (22-DUB)	2
Study the market	didn't do the work in really defining the market, the right market. And in the right personas that would respond to what we're selling. And., I didn't do my homework. If I'd done my homework to identify the right customers, and priced it correctly, I'd be a lot further along now, and focused a hundred percent of my time, which I'm doing now, I'd be a lot further along. But you know I'm really happy to be independent. (06-SFO)	1
Technology	I think we would have researched a few more technology because we were already starting with React Native and Rome which were both brand new technologies. We I guess were maybe overwhelmed with learning those, that we didn't look into a few other ones that would have been very hopeful to have started with (10-SFO)	1
Negotiate better	Lawyers: because we thought we needed them, they made good contracts, but this is what you do in the beginning. You pay too much, and then you learn. Next time you do better, you negotiate better. (17-BER)	1
Total		26/34

Table 23. Nature of digital venture creation process

Themes	Quotes
Constant iteration	<p>And we were doing the customer interviews for the previous idea, and then we started getting these questions about machine learning, and getting them on imbedded devices, like phones. And suddenly we have more of those questions, instead of what we wanted to do. So, we said, ok, that idea is not ready, or we should do something else. There's a lot of interest there, let's see what we can do here. So, we have added exactly 12 months this iteration, just under 12 months. (08-SFO)</p> <p>Well it's kind of a loop of research, read complicated stuff, convince yourself that you understand it, try to implement it. Realize that you don't understand it, reread it. There's a lot of testing, a lot of iteration, a lot of, you know, 'one step forward two steps back' - kind of stuff, but it's all just about being methodical and logical ... methodical is the word that what I'm looking for, I guess. I'm just making sure that you're sure of what you think you're sure and that that kind of thing. (12-SFO)</p> <p>And then, starting with one idea, realizing we have to accommodate this legal system after all, even though we tried to avoid it from the start. Then the joint-venture is the solution to it. (14-STO)</p> <p>My way of build business, is very iterative. That's how I work, it's very stressful for other people and for the organization. But I take one direction and start looking into it, and I start testing it with customers, then finally I get understanding, whether this is a right direction or not. And then we pivot the way from that direction, if the feedback is that this is not going to work. (24-HKG)</p> <p>We kind of always believed that we just go into the field and meet the people. It's a constant iteration process. To be honest, we don't know if the product we have now is the end product. Because we iterated one already. So, we started with machine translation, but we stopped the whole project in May. We worked on that for three months. Full time like you know seven days a week. And we got that proto working, it was there and then we realized this is not the solution we want. And then we strapped the whole thing and started from the beginning. (27-PEK)</p> <p>I created a very bad website on WordPress, a free website, and I sent an email up to about 5000 friends that I found on LinkedIn, Facebook, spam friends of friends. And I started writing a blog every single day and I got traffic and people would sign up. It's a combination, sometimes I just make shit up and hope that is works, I just rely on my gut, and there is not a lot of reason for why I do what I do. I just make it up, I like to steal from other industries, and look</p>

Themes	Quotes
	<p>how other industries are doing stuff, like ooh we should apply that here. I love studying different industries, I pick and choose stuff all over the place, I steal it and combine it. Other times we look at the data and we are very analytical, oh people are clicking on these types of things, we should do a lot more that. And other times I look at our competitors and where are they failing, and how can I succeed where they are failing. If I can do that, I would have a very valuable asset, one of these large companies is going to want to buy. We get hundreds of people a day telling us stuff. I just read it and make decisions based on that. If I make the title the headline article this thing, how much engagement it will I get. We noticed that when we state someone's name in the article, it gets more clicks and more engagement, so let's do that more often. So, things like that, so we can thinker ... Let's say that we are talking about Amazon. We could say like small stores are going have a hell to pay or we could say Amazon is about to crush small stores, and we say the word Amazon, we get more clicks. We have also consciously built our technology that tells us the answer. (09-SFO)</p>
Doubting the idea	<p>It is constant up and down about how you are feeling and how much you trust it. So, you definitely doubt it and sometimes you think this is the best thing that has ever been created and sometimes the worst (02-STO)</p> <p>All the time. It's not doubting the idea, I mean, I know that it will work, if we just do it correctly. It's more like do we find the best way to do it. The idea itself is good and doable, but then that we could really be close to the customer and meet their needs. I think that is what I am doubting and pushing ourselves to work on all the time. (05-HEL)</p> <p>Every day. Every day I am doubting, if this is the right thing to do. But I think through that process of doubting you also get new ideas, you improve your idea. And you need to be super stubborn to think not to doubt because that would set you up for failure. Yes, sure. That's the way to go forward. Sometimes it takes a couple of minutes to understand, then it stops. (20-TLV)</p> <p>Not the idea, but our capability to actually to pull it through. I am constantly evaluating that are we on the track to be the ones who are able to do it, or not. You have to do basically. (24-HKG)</p> <p>No no we're sure that this is a good idea. Yes, but we will change our ideas if the times or the society changes quickly. And just like last year we all caught the WeChat, but very fast Toutiauo told another very target medium is growing. (31-SHA)</p> <p>Yes. I keep doubting. Every day I'm thinking you know if there is anything wrong, whether I need to tune it. Because the world is changing, evolving every day. So maybe something that was correct yesterday may not be correct tomorrow. (32-HKG)</p>
Evolving idea and business model	<p>It kind of evolved. One of the things we had, a concept of coming together was, two things coming together, (11-SFO)</p> <p>Yeah, I think I might be able to answer that. So, the idea of the renderer itself, I mean, that's an existing thing and we're researching about it, and using what information there is out there, which might be very scattered and using that to figure it out for ourselves, really internalize it, and then build something a little bit more streamlined. And the idea that comes from it, that actually, kind of the product aspect of our project, the educational aspect of it. I mean, the idea and it comes from once again like the fact that we ourselves are trying to shrug through this project and we're there's constant roadblocks and there's constant gaps and it's so hard to find the right information. And that is like the main kind of driver for us to come up with this idea of making that easier for other people. Because we know that there are other people that are trying the same thing. We want is just something that we wish we had right now. (12-SFO)</p> <p>But then the business model as we thought originally was we would like to sell the licenses online or with the light but sales model at that those projects they were more like a consultative project. So, then we actually drift it did we didn't do what we were supposed to do. We were doing projects that were good. So, then we actually eventually we came back, so we wanted to kind of go back to these online sales ideas of selling things online. So, then a in the beginning, so we made some modifications to our plans and now we actually have like two different approaches to find the product market fit. (13-HEL)</p>

Themes	Quotes
	Well I did not develop it at the beginning. I kind of started with content and kind of just came into my mind, maybe I could use this to be an e-commerce. Yes, the idea is developing along the way. It doesn't develop in one day. (29-SHA)
Long- and short-term goals	Every week we have a meeting and then we think about what are our short term and long-term goals was what I said was for the week. And what is the easiest way for us to get to the long term and short terms goals. Things like in short term, we need income. We need to get someone to pay for our long-term goals. In long term we want to be huge scale we want to be a global platform that combines people. So, there's a lot of rambling along about. That's something that we are still kind of working on. So, I'm doing mostly web development. The thing is the machine learning part is something that we have in the pipeline but it's not something that is the main focus at this point. It will be, the machine learning will become a thing. But it's not something that would make us money right now. Because we need events, we need interpretation for the events, and that's something that will make the life easier and that will increase the stickiness of the interpreters themselves. But it's not something we actually are working right now. (27 –PEK)
Lean, agile way of developing	<p>The second direction is, you know, that's the one that people teach you in the entrepreneurship classes, iCore and Lean start-up methodology and that kind of stuff. We are definitely doing that and spending a lot of time on that but we also noticed that when you are a platform, which we are, deed in a stack, technological platform infrastructural company, engineers react better if you give them something first. You just cannot go to the engineers, trust me we know, we got kicked out of meeting from big companies, because we listening too closely what the Lean start-up says and you know, you are just going there and saying what are your problems and tell me what you want, does not really work (08-SFO)</p> <p>we have a lot of different ideas on the table, let's go out to the market and really start interacting, do some market research, to identify are people are interested in the concept, is there a need, do we have a product-market fit, if we build this. (11-SFO)</p> <p>Right now, we know our website and mobile content we have is not awesome, but it is only the beginning, but the design has to change. The functions are ok, they are working and that's pretty cool, in my opinion, they are working well, things we've done. But the design has to change. None of us as a founder are designers. This is a big step, one we have to do. It is a huge thing after the feedback my co-founders told me. We have the first big client, then we have a lot of traffic, and we have to make sure that the traffic is ok for us. But right now, we are not scaling, we are developing, (15-BER)</p> <p>Like he goes there, test our product, gets feedback, and actively seeks for people and seeks different people and we try to push him wherever we can. We get feedback and then we analyse that, what are the opportunities here, what do we have, what are the costs of going to a certain direction. We do like week sprints will it's this kind of a lean development in certain sentence. (27-PEK)</p> <p>So, this is B2B. I try to go and follow the lean B2B methodology. So, there's that Lean start-up, but that's like more B2C. So, you come with the assumption and then you try to validate your idea. But with B2B it is more, because your clients are more professionals so they don't buy because it's fun, they buy because they need it. (28-PEK)</p>
Speed	So, then we had, I think, two different versions that that did not work out. Yeah early 2015 when we had the team in place, meaning that the full starting to develop the prototype, and we were all working part time for this case. That's how we continued. we did the first prototype, testing with the customers in 2015. And, some more in autumn time. And, then we realized, that if we want to proceed ... I realized that we have to proceed faster, if we want to make a business. And, then we decided to outsource part of the development because our developer wasn't able to do that much because he had a day job, and we were not able to pay salary. (05-HEL)
Timing	<p>And also, the U.N. Sustainable Development Goals the number one development goal is to reduce poverty. This is by 2030. You say actually it's in line with the World Bank and the U.N. goals. Say we do we think the timing is right. (04-LON)</p> <p>There is the trend, people are moving from pictures to videos, so that is a trend that is already happening, you can see across the social media platforms and so they are moving. So,</p>

Themes	Quotes
	it's the right time for my app, because my app makes it easy. So, I am catching a train, and I am making it easy already what is happening with social media. (19-LON)

Table 24. Doubting the idea

Themes	Quotes
	<p>Many times, I am a critical researcher, so my nature is doubt. But it is easier to doubt when you have money on your account. (01-HEL)</p> <p>Often. You think you be a billionaire or bankrupt every second month. It is constant up and down about how you are feeling and how much you trust it. So, you definitely doubt it and sometimes you think this is the best thing that has ever been created and sometimes the worst (02-STO)</p> <p>Well there's always doubt people. Some people doubt it. Some people say it's a great idea and go for it. So, within the company, we just need to keep going forward. We've got to go. We need to get it done. And who people doubt it are usually other people. As the idea itself it provides actually a win win position for everyone. If the employee is they can keep that good employee and they won't end up in a death spiral effect, so that's good for employers, for the employees they didn't go into debt spiral, they can keep eating, they have shelter, so that's good. And then for affects the shops. They have people coming into the shops who can actually afford the goods. Meaning if actually they're going to begin to be paid they know they're going to keep it. The thing will always be is at the right time to produce. 04-LON</p> <p>No, never. I said no because we showed it to people who could be trusted, and they were interested, they wanted it. (04-LON)</p> <p>All the time. It's not doubting the idea, I mean, I know that it will work, if we just do it correctly. It's more like do we find the best way to do it. The idea itself is good and doable, but then that we could really be close to the customer and meet their needs. I think that is what I am doubting and pushing ourselves to work on all the time. (05-HEL)</p> <p>Yes. I am pretty sure everyone is doubting your idea. You have to be in love with your product, I am. But you may not be choosing the right decisions. Every founder should doubt the idea, and ask, is the idea right, the way we do this, is it ok, is it good for customers. To doubt the idea is not bad at all. You don't have to get stuck into doubts, you have to focus on the things you do. (16-BER)</p> <p>No. Maybe sometimes you have doubts if it really will work out because sometimes you realize it is harder than you expected, because I mean you know that your idea is great but 80 million other Germans should also know it. And this is where sometimes I would say there comes a feeling of like, holy shit, it will be very long journey. We were talking so much with very different people about the idea. And I think that even if some people are saying like some people they say like be aware and don't it too easy yourself. But I think in general nearly everybody says like it's a great idea. (16-BER)</p> <p>Every day. Every day I am doubting, if this is the right thing to do. But I think through that process of doubting you also get new ideas, you improve your idea. And you need to be super stubborn to think not to doubt because that would set you up for failure. Most intelligent people have that problem of self-doubt, like once you reach a certain level of intelligence you are not only questioning the things around you, you are also questioning yourself and your ideas. At the end of the day if you have doubts you also have the know and motivation, I am sure we are going to make it. (17-BER)</p> <p>You doubt whether this idea will survive above others are really bringing a paradigm shift. And when you think more and more about it and look at that cost which people are paying today, to get written when the passes get returned and delivered the next day or the day after. And with the time consumed and those cities are getting very crowded, especially in the Indian scenario. Where in a typical delivery may bring in additional one or two hours to the delivery boy. It's not cheap. So. And the traffic is growing and parcels traffic growing even faster. (18-BER)</p> <p>You see giants these days, the monopoly that there is out there, like these big giants, so you are going to compete with Instagram, how am I going to compete with Instagram? But no, it's</p>

Themes	Quotes
	<p>not about competing or not competing with them, it's about doing what you believe in. And their app was once small as well, you know. And then, they can see in you instead of crushing you, they can see an opportunity to join with them. Then you keep on going. (19-LOND)</p> <p>Yes, sure [doubting the idea]. That's the way to go forward. Sometimes it takes a couple of minutes to understand, then it stops. (20-TLV)</p> <p>All the time [doubting the idea]. (21-TLV)</p> <p>Actually, the only thing that is making me a little bit unsecure, is when people start to ask what about the business model. If companies want to show/do corporate responsibility and fund us, this could also support us. We don't want to charge money from the elderly or from our volunteers. People are saying that be aware, it can be a problem someday. (22-TLV)</p> <p>About every day we asked the question to each other. Are we doing the right thing, are we going the right direction, is the solution we are bringing, is it real. Does it bring value? Every time we faced any new sort of information we kind of make micro stock go decisions as a team, but also towards the investors. And eventually we realized that we were not doing the right thing, building B2B system on Symbian was not the right thing to do. The market had changed by the time that we started to ... before we got to market. (23-HEL)</p> <p>Not the idea, but our capability to actually to pull it through. I am constantly evaluating that are we on the track to be the ones who are able to do it, or not. You have to do basically. (24-HKG)</p> <p>All the time. . So, I think the one like darkest times is when the reality hit. That was around the time in May when we were still waiting to be approved, but is what we believe that there is a demand a need for this so he was always clear for we just didn't know what was the right direction. We're not still sure entirely. But around May the reality hit that you know I'm like in three weeks I'm going to be out of money. Like I could it be having a good paying job in Finland. I said no to my exchange studies in September, so I could get a good job in Finland for the summer. We were in Taipei in AI studies there, laid out, everything easy. And now I am in situation, in three weeks I've had no money at all. So that was a bit of a dark patch. It was never like it's always like you know kind of this like frustration and like this is not going anywhere kind of like it's just like lying in bed at night like shit, what am I doing. (27-PEK)</p> <p>I believe in myself so much. I don't doubt my idea but I test the original thoughts. (29-SHA)</p> <p>No no we're sure that this is a good idea. Yes, but we will change our ideas if the times or the society changes quickly. And just like last year we all caught the WeChat, but very fast Toutiao told another very target medium is growing. So, they also catch the audience size. So maybe we will change that and the different content for them. So, it's really hard time for us because we have passion late car experiments. (31-SHA)</p> <p>Yes. I keep doubting. Every day I'm thinking you know if there is anything wrong, whether I need to tune it. Because the world is changing, evolving every day. So maybe something that was correct yesterday may not be correct tomorrow. At first my initial idea, two, three years ago, but the problem is, I may do it too slowly, because I didn't get the funding first, whereas people already have done similar things. Then when people haven't really occupied the market do I need to tune my business model. So, every I think every once in a while, you need to review yourself and whether you need to keep tuning. (32-HKG)</p> <p>Of course, I think everyone is always opting out of the choice they're taking. Yeah of course. (33-DUB)</p>

Table 25. Critical events

Critical event	Quotes	# mentions
Business model, Pivoting related	<p>We had the idea to go to the US, and decided we need to build more robust, bigger company with revenues, and I think that has been important for us and good we decided to stay. Banks obviously have not been very happy with us, because we bring the competition, so throughout Europe they have threatened and blocked and sued companies doing similar stuff. We have former banker here as a chairman, which was really good for us to get that from the start. (#02)</p> <p>I discovered other revenue avenues, like licencing this technology abroad, so that even though I won't be operating specifically they can also take advantage of the data that would be understanding and provide the service to their users as well. (#07)</p> <p>The first idea is not something that can work, be viable. It's not a viable business at the moment. It might be viable for an established company, but definitely not a start-up idea. So, finding the courage to say, scrap that, new idea based on the customer research. So, I think it was painful, we needed to admit to ourselves, and others, that what we are talking about is not going to go, and so that was an important one. (#08)</p> <p>In 2015 when we actually pivoted the whole start-up. Most people came from these games. It was a decision, actually pretty easy to make, but that has actually been the biggest critical point or incident and that has shaped, what we are now. (#13)</p> <p>When I said we have to move to his loyalty area and start rewarding people. And that seems to bring a lot of traction from operators and other large companies, they are missing this kind of tools. It remains to be seen, but if we get really them buying this, we get their user base to scale this. Most of their customers are prepaid customers, so they don't have a reward solution or loyalty solution. (#24)</p> <p>I think what completely changed my direction from wanting to build a technology product, to starting with consulting, if that could be a turning point. I've always been like more about technology, and then I talked to my clients and I realize that, at least for my sector, it's still kind of important to start with consulting, and then launch the product. If I do it, then you already have an established relationship with them. And then to ask do you want to try, it's cheaper and it's more efficient, then they might give you the chance. But if it's just me going out and say I have this product, no one is going to try. And I can't really compete with existing policy houses, have consultancy and have a reputation, because this product is going to replace them in a way. (#28)</p>	6
First user, customer	<p>And I doubted if this was right, we didn't have clients, no money, is this the right business. Then at a very desperate moment, one of the clients called be from the first tournaments, they are planning to do a national tournament by a big company. He wanted to have an offer, it was a big deal by that time. (#01)</p> <p>A major airport opened up an RFP for us specifically, so we convinced airports that they need this. That is what basically happens when you want to have a service at your airport, and then so they have to open up their airport council, so it is a huge process. So that's a really, really huge thing to happen to convince them that. (#07)</p> <p>The important one, be our first user. Committing resources, to the point where we have weekly meetings, their engineering team, our engineering team, and just someone, who clearly needs what you are building. And is willing to invest time and money to guide you through, this is what I want, this is what I don't want, and just understanding the actual needs, not just the things we think they need, but not what they say or don't. (#08)</p>	5

Critical event	Quotes	# mentions
	<p>We have the first big client, then we have a lot of traffic, and we have to make sure that the traffic is ok for us. But right now, we are not scaling, we are developing, right now we are not in that stage. (#15)</p> <p>We got first actual clients, they bought beforehand 10 events from us. So, they pay us, we will use our product in events so we got support from them. We used to demoing our product a lot around anyway. So, but that was the first time we had like actual contract. I think that was one turning point as well, like a milestone (#27)</p>	
Funding related	<p>Money has been one critical thing. We have all been doing this as part time instead of full time, the progress hasn't been so fast as it could have been. And either we could not have been able to scale anything which would have caused us to do something else. But then on the other hand, I have seen that also as a positive thing, because if we would have had the money in the beginning, we actually would have done wrong things. So now that we have to do things a little bit slower we have been able to have more discussions with the customers and even more in detail. And our first solution, if we had the money to build that directly then, would not have turn out to be good. (#05)</p> <p>Getting our first investors, was obviously very, very big boost of confidence. And they have, if you are working with angel investors, have been our champions and help a lot to bring their knowledge and making sure, that what we are doing is correct, they really believe that this is going to be a billion-dollar company, and that's what they are going through, all the research that I have been doing, verifying. When I had an angel investor that was a woman, it is very hard to connect with women in tech in general, so finding somebody that I could really identify was helpful. (#07)</p> <p>Raising our money was another one. There is only so long that everybody can go without being paid. And everybody at the end of the day has bills to be paid. I don't think it was disastrous, but I mean I think it is always a frustrating, you are not really in control of the timing of that process. So that was something along the entrepreneurial journey. (#11)</p> <p>Then I think one critical incident was this, governmental grant. Which actually gave us revenues but also misguided us for a while from our original target to be like online SaaS service or software as a service product. (#13)</p> <p>One critical event was last year, when this ICO boom started happening. There were companies started issuing their own tokens. I have been watching it, and we didn't have that as a plan. But then I realized that this industry will finance itself this way, and if we don't do it, then we are not going to be the ones competing in this area. So, we made the decision that ok, we will make our own token and funding through that. We were able to raise 10 MUSD funding with this way. It was super difficult and required a lot of skills to manage that, but we did it anyway. That was a critical decision, so we are currently able to build this phase, where are actually able to show how it works. And it can be financed with traditional investors as well. (#24)</p> <p>We were running out of money, it was a hot point, now I'm living on a credit card. We got also a personal loan. So, we did a personal loan with no contract, which is, you know, a really good deal for him, but still we got a good evaluation at that point, so we got that and then with that money we hired our first developer. Four months of struggling and trying to think about what's up with the company. Then it kind of started, we got our first seed (funding), we hired a couple of people on board, and we started actually pushing to get the company ready. (#24)</p> <p>We've got the first, the phase 1 of the Horizon 2020. It was an amazing news and now we are on the on the phase 2 of Horizon 2020. (#34)</p>	7
Partnering	<p>One critical event was when we decided that we are going to start to do inbound marketing. So, what is the let's say the marketing approach and then reselected advanced B2B as our marketing companion. It was also 2016. Like a maybe third or fourth quarter. Then we started to cooperation with them. Then one critical incident was that the point where me decided that actually that it was not maybe a right decision to outsource the marketing</p>	2

Critical event	Quotes	# mentions
	<p>because then we were not a we were not agile enough. Even though the method was agile but then it's not agile enough for our product market fit finding activities. So, then we decided to end the cooperation and take it over to ourselves. (13)</p> <p>And then, starting with one idea, realizing we have to accommodate this legal system after all, even though we tried to avoid it from the start. Then the joint-venture is the solution to it. (14)</p>	
Proto, MVP related	<p>They are the critical parts to build any app or anything it's always going to be people, because any business starts with people, then after that it's going to be by prototype. But with prototype you can put that in any business to try to prove the concept what do you want to do. And then the end will be like going to into the action and making it to happen. It's critical for any business, the principle will still be the same, you are just going to change the words. (19)</p>	1
Radical change in competing environment	<p>Apple changed its mind about not allowing us to do that business model (SFO-11). See Example 6, Section 6.1.5.</p> <p>Well emergence of Uber. The failure of Nokia and in that sequence. The failure of Nokia not was particularly devastating for us because we have developed our B2B platform on Nokia's Symbian devices and we leaders, and our own store road map would have integrated our solution directly to Nokia and have preinstalled 200 million devices globally in 2000. And then Nokia decided to let Symbian go and our strategy went down the toilet. (23)</p>	2
Regulations, law related	<p>2015 But one year ago, EU decided to adopt new directives that all banks must open up services like us. And that kind of was ... that changed a lot the business view of this. So, there is now way of being so hostile on us and that we should work with them more. That was important. (02)</p> <p>Sometimes we started out as bad decisions. We paid for our first lawyers because we just didn't know better. They were charging us by the hour and they were the most expensive lawyers in Berlin. Because we thought we needed them, they made good contracts, but this is what you do in the (17)</p>	2
Start-up ecosystem related	<p>Relocating to San Francisco. (09)</p> <p>I have many times taught that I should have moved from my original town sooner. The town is scares in resources, low paying clients, not that many talents to recruit, not that many innovation ecosystems, it is a smaller hub. It is the size of the hub or the ecosystem has a . My entrepreneurship struggle has been with a big struggle to get away from there. (01)</p> <p>Starting here in Rabbit Cloud was definitely be another critical of event. We were lucky. Yes, really good to find you guys. I mean I was trying to find teammates like all of December and no one with you like when people were like Yeah it sounds interesting but I'm not sure I can do it. And then I pitched the project just me not having a team yet. And then like some of your buddies were like hey look you should talk to a friend you like he's really into this kind of stuff he loves this, and then you know Eric and it just worked out. (12)</p> <p>November 2017 we were chosen to be part of an accelerator, that is related to the JDC. And then we joined the accelerator and they helped us to develop the MVP, the pilot. And then we won in May 2017 in accelerator competition, we got the first investment (200 000,00 ILS = 47 562,43 EUR) to launch the app. It is not a lot, but it really help us to do ... (22)</p> <p>Well from the beginning we it was only me and my co-founder. So, we were just coding, two of us. So that we were in a couple co-working spaces testing it out, trying it out, the main first major kind of breakthrough maybe was, because we got into this accelerator in Beijing, so that place is</p>	4

Critical event	Quotes	# mentions
	<p>incident in a positive way. Looking thinking about two day to day situation. Of course, you could have also insourced, there will be a software coder or all but I think I would say it's better. (13)</p> <p>Also, the time with freelancers, we tried out a couple, and it turn out super hard to find good persona and to have one person working on a project is usually quicker than having 2-3 persons working on it. At four you get to the same speed, maybe a little bit quicker, but 2-3 are usually not as quick as one developer, because they have to talk a lot with each other, one developer can just go along, because he knows everything. (17)</p> <p>Ah it was like finding the right programmers, and there was the start, we did try out like three before finding that is actually working and doing a proper job. (19)</p> <p>We had many critical events because at the beginning I didn't find my CTO. I contacted many developers and they're well not very efficient. So, I had to cancel the mission and it was very complicated for them to have the same vision. So, everything started once I found my CTO and we were already on phase and we developed it well together. (34)</p>	
Technology related	<p>People signing up. To be honest, first we launched a web version of our solution, and it didn't work out. So that wasn't good enough, basically the same technique. And nobody spread it and nobody introduced it and no new sign ups. And then we rebuild it as a mobile app instead and that part was better. Nicer. And then it kind of went off. 2013 Failure of web service. (02)</p> <p>Just making the decision very early to move into online in 1995 and going into business for myself in 2001. Weathering the early days and when until people really started embracing email marketing. Making money and then the race to the bottom on pricing, that just changed everything. The model used to be pricing was per email sent, per person. Now pricing is based on active contacts. Can you send all the email you want? Big difference. Somebody in an account would go from spending ten thousand dollars a month or more to less than a thousand. (06)</p> <p>First the hurdle of how to use React as a language, because none of us knew how to use it. it was a great thing coming from 42 because we don't look at a project and say, okay you know, he knows how to use this, you know how to use this, let's make a project out of that. We look at the problem itself and say, what is going to be the best way to solve this and we can sit there and we can learn that tool. I guess after you learn how to use the tool, then you can start learning the nuances of it, and then you get your first product, which I guess was our alfa, that was that was definitely a big step for us. First time we ever put an app on a store. So, it was very much like small goals down the road. We're pretty much did like one screen at a time at first. One component at a time. That is a good motivation, because you can see real results. That's what's good about building like software that has a UI (user interface), a lot of the time you don't get that gratification, because we do a ton of projects, where all of it, you know, it's just like how it's is just running and you don't see anything, back end. And if the result pops out, it pops out and it's like cool. But here with this we get to build something that's tangible and see and play with. So, we went from those sticky notes on the walls of the app. Those were our first concept designs. (10)</p> <p>Other big breakthroughs would be (in November) importing really complex models with textures and various materials and stuff like that. That was the hurdle that I got over in early December, and that was probably the most gratifying thing, where I've gone from making a scene with like six shapes, to making a scene with three hundred thousand shapes. All of which have different textures and materials and reflectivity and all of this stuff and the fact that it like it just worked, like it did, and rendered and it just looked right and it looks even better now. But even at the time it was just like yeah this looks like a physical place and then posting it on Facebook and people saying like 'Yo' I really thought this was a photo, until I looked closer and stuff like that that was really gratifying. I guess those have been the two major breakthroughs. And there's one more technical one, but the</p>	6

Critical event	Quotes	# men- tions
Technology related	<p>important sampling breakthrough more recently, which was the big thing. That was sort of a big break of light finally feeling like I understand the theory a lot better. That was some research I was a week or two ago. (12)</p> <p>In the beginning, we had many critical events, when the website didn't work, they couldn't register to the website, and when you have 3 to 4000 users, so we changed that. Then we had like a pivot moment, when there was a woman who tried to pay through the platform but she couldn't, apparently could not see the apparent blue case, she didn't see it. But she sent through PayPal not once but eight times, so we had 800 euros in our account and then we had to send it back to her. And then we paid on top the whole transaction fees from PayPal, so that was kind of enlightening moment for us. Maybe we don't do payments through platform, maybe it is too complex. Maybe we just connect the people and take the premium fee. Now we only take the premium fee. (17)</p> <p>Something critical happening all the time. You know, some system stops working for example, some block of the system stop working and somebody did not get your service ... anticipating to get your service and not getting it, as usual. Sometimes in a way home you are starting to check things and starting to think what starts to break in your service. (20)</p> <p>Another critical event from the product side decision was made by my CTO, that we saw this has to be web-based solution. If we are an application, we won't be scaling. We nowadays don't want to download applications. The user cost of download is about 8 USD, it is a huge marketing cost to get people to download. And that is one thing I have been talking about, that is why the start-up industry has to move away from applications to web based applications. Nobody can find us, you can calculate, that if you want to be a relevant application, you need million users, that mean 8 million USD for marketing costs. So how can you find that money, if you are an early stage start-up. The only way is to be a famous start-up entrepreneur in Silicon Valley. So that doesn't work anymore. It used to work, when there wasn't so much competition with the applications. (24)</p>	

Table 26. Location

Theme	Quotes
FinTech, location matters	But in our industry, it's a huge thing the international part, the market, the how does it work there, legally, technically, people thing about money in each country, so that the first issue, how we deal with that. We started with a few countries, we started with Pakistan, Vietnam. And the reason we did that was that our philosophy was that we need to find the connections. So, the EU was an interesting place, so we were going through different countries, like the ones of Malta, Ireland, and we were looking at the Baltic states; Estonia, Lithuania. Because it was .. the legalization is the same, once you have been approved it is relatively easy to export that license to the other ones, then we could work throughout the EU, that was the plan. But even so in the end, when we intended to start from Lithuania, because we didn't need to have any physical presence in Lithuania to start the company and get the license, and there were many reasons for that. We were going to open a seed round, because we needed money for this licensing procedure (Autumn 2017). (14-STO)
Location does not matter	It [London] didn't change anything, that's the beauty about apps, it doesn't matter where you are developing the idea. That's what is going to play a part is when I launch it, and I am launching soon, the market that I am going to pursue. Am I going to pursue London, am I going to invest more to pursue America? Probably, because the bigger market it there. So, it doesn't really matter, where I am living, it's going to matter where I am going to focus my I launch, and my users, not where I am based. (19-LON)
Start-up ecosystem	<p>We are not exactly in Tel Aviv, but it is the same ecosystem in the entire country. It is a small country. The ecosystem helps a lot. The entire atmosphere here is very start-up oriented in Israel. It is completely different approach, compared to other countries that I have visited. The incentive is very different in other countries, because we are working with other countries as well. We are hiring developers for example in Ukraine or Russia sometimes. They have completely different personality. I think it's the environment is different; the ecosystem is very different there than in Israel. I don't know if it is because of us, or we are like this because of the ecosystem. But the ecosystem is very supportive in Israel, it is affecting a lot. If I need for example a partner for me, it's kind of one second, I can find somebody in Israel. Sometimes it is difficult, because you have many like you here, you have many entrepreneurs here. You have many people here thinking out of the box, you have many start-ups, many who are looking for investment or their next idea. The competition may be harder than in another country. (20-TLV)</p> <p>Yes, very helpful. It is very easy to reach out to people, I'm not sure if it is like that everywhere. Entrepreneurs just seem to be really accessible here. And they are really fond of helping other entrepreneurs. I had the chance to talk to many successful ones running their own business, and they gave me 30 or 60 minutes of their time, just because someone made an introduction. So that's amazing. There is this entrepreneurial knowledge out there and it is really accessible here. (21-TLV)</p> <p>Beijing ecosystem helps me immensely. That's a definite yes. I wanted to be entrepreneur last year like March. And then I decided that it has to be something about policy for me to be driven. Around August I went to a start-up weekend that was I all organized by UNDP here, UNDP Beijing, but UNDP Bangkok in December last year (28-PEK)</p>

Appendix 9 Venture creation process of mobile application/web-based solution (Stockholm)

	Venture creation phases	Innovative mobile app/web-based solution venture creation process
	Digital venture idea	On behalf of the user [we] aggregated the data from the banks to present one holistic picture in a service, basically you can aggregate all data from the bank accounts into one service and get overview, transparency and build that digital environment that the bank wasn't able at the time to provide
ANTECEDENTS	Earlier experiences	Economics degree and engineering, physics, economics, a programmer (done software development 10 years), one co-founder worked for an investment bank, another for a hedge fund
	Change in technology & regulations	We felt that the personal finance or financial technology is kind of an area, that is going to be disrupted, that was the thesis and it had not happened before. We felt we have the background in this, we want to be entrepreneurs, it's likely something is happening in this area. The most important question was, is it possible to build a technology that on behalf of the user logged into the banks and get data and present it. But one year ago, EU decided to adopt new directives that all banks must open up services like us. And that kind of was ... that changed a lot the business view of this
DEVELOPMENT	Studied the market and companies having this kind of service	Started to browse the market, so what have other people done in the US and elsewhere, what is working and what is not working. found one service abroad, hat they did was that on behalf of the user they aggregated the data from the banks to present one holistic picture in a service, basically you can aggregate all data from the bank accounts into one service and get overview, transparency and build that digital environment that the bank wasn't able at the time to provide. There had been a similar company in Sweden, but they didn't get the product to work.
	Creating fast prototype	Tried to build fast prototype, I mean, it basically didn't work, could be reversed to the banks in Sweden and it worked, and we felt that let's go for it. INTERVIEWER: And you did it yourself? Did you have someone else? INTERVIEWEE: No, we did it ourselves.
	User needs: trust in technology Developing user experience	In this business you have to create trust in technology and you have to build a consumer experience around it, and you need everything to work. Maybe one of them had the technology but the UX (user experience) and someone. we were lucky to release a product people loved and when they do start spreading it to friends and family and back on that you can have the organic growth.
	Testing with users and getting feedback/validating the idea with different people in the industry	INTERVIEWER: How did you test the prototypes? INTERVIEWEE: We basically tested with our own bank accounts. We just asked our friends and family to try out. We re-evaluate everything. No, we don't feel we are locked in some way. First it was important to get this former bank CEO, second, we reached out 100 -200 key stakeholders we thought would be important in Sweden. And that could be anything from tech bloggers to security experts. So, we talked to them via email and invited them to the beta, and this is who we are and feel free to ask any questions etc. And then we also built the beta community for end users to sign up to try out this service before we launched. So maybe we had 1 000 of those before we launched. So, they were great ambassadors.

	Venture creation phases	Innovative mobile app/web-based solution venture creation process
CRITICAL EVENT	First outcome as a web-version of the service did not work → changed to mobile version	<p>First, we launched a web version of our solution, and it didn't work out. So that wasn't good enough, basically the same technique</p> <p>INTERVIEWER: So, nobody came to the pages?</p> <p>INTERVIEWEE: Exactly. And nobody spread it and nobody introduced it and no new sign ups. And then we rebuilt it as a mobile app instead and that part was better. Nicer. And then it kind of went off.</p>
	Doubting the idea	You think you be a billionaire or bankrupt every second month. It is constant up and down about how you are feeling and how much you trust it. So, you definitely doubt it and sometimes you think this is the best thing that has ever been created and sometimes the worst
BUSINESS MODEL	Monetization	Ultimately monetization is most important but attention and growth are the proxies for monetization. Eventually we want to start monetizing users. Typically, we have thesis on what's most important right now, is it monetization, retention, and when we do we have a number of thesis, how we can prove retention or growth
FUNDING		If our company is not successful, then we probably have to raise more money. And if our company is successful, we probably have raise even more money, because then you want to scale it faster. So funding is a risk always. Now we have a good funding market for many years and it might change.

Appendix 10 Venture creation process of SaaS and Platform as a service aPaaS service (Tel Aviv & Silicon Valley)

	Venture creation phases	Innovative SaaS venture creation process (Tel Aviv)	Innovative (a)PaaS venture creation process (Silicon Valley)
DIGITAL VENTURE IDEA	Type of venture idea, technology base	B2B, AI involvement, involved in start-up community	B2B, AI involvement, involved in start-up community
	Digital venture idea	Our solution is SaaS solution, so we see it like this, it is a service. Our idea is based on artificial intelligence, we have developed some engine, that can recognize appropriate content inside of the traffic. We can filter it out with some kind of next generation of fire wall,	It's a cloud hosted tool chain, our tools are in our cloud, users can just use them as a service. Essentially, what it does, is users can take their own networks they developed, in their R&D, they dump it into our cloud and we produce the version, that is ready to be deployed, on a cell phone, or on a camera or something like that. We package the neuro network for their consumption. Easy consumption. a platform, which we are, deep in a stack, technological platform infrastructural company. There are two parts, the first one is, we take the neuro network that is designed by machine learning people, and we optimize it so it runs faster and with less battery consumption on the phone. So that's the first service that we have.
ANTECEDENTS	Earlier experiences	Yes, not in the security, personally I am not coming from the security field actually, because we are now in the field of cybersecurity. I am coming from the distributed application with a large scale, I can build a very scaled infrastructures and applications. That is my expertise, and my co-founder is expert in cybersecurity so we are working together on this idea. Everyone bring along his expertise.	Most of the things we do are with one way or the other derived from our PhDs, 8 years of combining Berkley and from MITI was working for a semi-conductor company building design tools and I guess my co-founder was doing hardware and software co-design for his research. And I did a bunch of research on high performance computing, hardware saturation, that sort of stuff.
DEVELOPMENT	Pivoting		The company was actually incorporated in 2015, and we had a government project which we've done. Spring 2016 we started like interviewing people, customer interviews, research, we took all these classes, we went to iCore, and it took us 9 months to realize, that the idea we had before would be tough to execute. you have an initial idea, it needs to be in a face where you just start to talking to people and validate the idea, like, I think it is progress regardless of whether people agree with you or not. We had to pivot, I see that as a progress, we could have it earlier, but I think it is also, there is a necessity having people telling you negative things or deriving negative conclusions from how people behave to understand how you should pivot. And it is always tough to say, is this too early to pivot, or have we had enough evidence that we want to do something different. It is hard to say if we could have reached that

	Venture creation phases	Innovative SaaS venture creation process (Tel Aviv)	Innovative (a)PaaS venture creation process (Silicon Valley)
	Developing with customers	<p>We used to develop all the time. When we have a new idea, we are just starting. We don't need any initiatives, it is a very quick issue for us. So, we have an idea and we're just starting to work on it. We don't think of incorporating some other stuff, we are just starting to work on it.</p> <p>INTERVIEWER: Did you already have customers when you go the new idea?</p> <p>INTERVIEWEE: The different segment actually. We first offered it to different advertising companies and started working there. But then we started to think where can we deploy it in other areas, and we decided we can go wider, not only advertising. But now it is pretty popular among advertising.</p> <p>INTERVIEWER: How do you develop it with the customers?</p> <p>INTERVIEWEE: We build the architectural schema, what will be the modules of this system, we'll connect this one, and here this one, and here we manage process, all kinds of things. And we think how to predict and prevent the problems for example, bottle necks in the system. It is like a reflection on the water, it is going to build something very small, quick and dirty solution, and then we are thinking how to deploy, what will be the way even to develop. How we will manage the developers, what kind of developers do we need for this solution. And then we build the process of development. And then we start the development itself.</p> <p>We are B2B business, it is completely different than B2C business. In my opinion it is much easier to work with business. Business is more predictable than consumers. You never know what consumers will complain about. For me it is more difficult to predict what consumers will ask for, or what will be his behaviour. So, I think B2B concept is much easier.</p> <p>INTERVIEWER: Do you develop your business by customer demands?</p>	<p>point earlier, I guess I am reasonably satisfied with how fast, or the speed which we decided to do different thing.</p> <p>We are also working with early users, they are constantly giving us feedback, what specific features they want, so we are collecting data to know what our product roadmap should be like.</p> <p>The third in my opinion, the important one, be our first user. Committing resources, to the point where we have weekly meetings, their engineering team, our engineering team, and just someone, who clearly needs what you are building. And is willing to invest time and money to guide you through, this is what I want, this is what I don't want, and just understanding the actual needs, not just the things we think they need, but not what they say or don't. That was the third big moment for us.</p>

	Venture creation phases	Innovative SaaS venture creation process (Tel Aviv)	Innovative (a)PaaS venture creation process (Silicon Valley)
		INTERVIEWEE: Yes, all the time. I am testing myself sometimes questions sometimes from our customer. I think what can I do better all the time. So, it is the easiest way actually to do this. Because I don't want to start a big project, it may be in braking something in our current system.	
DEVELOPMENT	Market research		<p>I guess two parallel things we are doing. We are constantly interviewing people, trying to find the best product-market fit, the market segment to start with. So, we have another co-founder who is a business person, he reaches out to tens or hundreds of companies a week, and then pre-screen to talk a little bit about if there is any interest. If there is some interest, then we do a second-round interview with them to see like, what are their needs. And then we go back and try to make sense of the data, that is one direction.</p> <p>iCore and Lean start-up methodology and that kind of staff. We are definitely doing that and spending a lot of time on that but we also noticed that when you are a platform, which we are, deed in a stack, technological platform infrastructural company, engineers react better if you give them something first. You just cannot go to the engineers, trust me we know, we got kicked out of meeting from big companies, because we listening too closely what the Lean start-up says and you know, you are just going there and saying what are your problems and tell me what you want, does not really work.</p>
	Development out-sourced	<p>INTERVIEWER: So, you hire developers outside your team. Do you have other actors outside your team developing the idea?</p> <p>INTERVIEWEE: Yeah, all the time. Sales person for example, we hire a salesperson, so we tell the salesperson what is the product. Modern working environments are very integrated, we are working for example with the AWS, as a hardware provider for us, it's virtual hardware. But all of my solutions are, in 10 recent years, were based on the cloud platform, we are detecting some kind of defining actually, work on the infrastructure, you don't need to contact personally. AWS is an example of the ...</p>	
	Testing with suitable technologies	We have some action, but we don't want to associate with blockchain technology. We did some interesting testing with this, we drove some interesting data to the blockchain, and we managed to get the long data there, we thought about it. Maybe	

	Venture creation phases	Innovative SaaS venture creation process (Tel Aviv)	Innovative (a)PaaS venture creation process (Silicon Valley)
		in the future. There are couple of ways to implement it. Right now, it is working on demand. We want to do this actually (the streaming possibility), scan the traffic all the time, the same engine with a different way of working.	
CRITICAL EVENTS	Critical event	<p>Something critical happening all the time. You know, some system stops working for example, some block of the system stop working and somebody did not get your service ... anticipating to get your service and not getting it, as usual. Sometimes in a way home you are starting to check things and starting to think what starts to break in your service.</p> <p>I think it is all the time critical. We are used to work in this environment in which everything is very critical. Sometimes customer calls you and says that we thought we would get it this way, or your service looks like degraded, or your error rate is higher than usual, or something.</p> <p>Sometimes is based only on the feeling of the customer, but you have to check it all the time. I think we are all the time in kind of stress. We are used to.</p>	<p>I think my co-founder got some incoming requests for the saturation of deep learning on various kind of devices from platform vendors basically, hardware manufacturers.</p> <p>And we were doing the customer interviews for the previous idea, and then we started getting these questions about machine learning, and getting them on imbedded devices, like phones. And suddenly we have more of those questions, instead of what we wanted to do. So, we said, ok, that idea is not ready, or we should do something else. There's a lot of interest there, let's see what we can do here. So, we have added exactly 12 months this iteration, just under 12 months.</p> <p>The second critical event, in my opinion, was us realizing the first idea is not something that can work, be viable. It's not a viable business at the moment. It might be viable for an established company, but definitely not a start-up idea. So, finding the courage to say, scrap that, new idea based on the customer research.</p>
	Speed	<p>I learn all the time, how to make development more effective.</p> <p>I am looking for new tendencies and new trends, and I am trying them all the time. Always I think, what I can take from this. In my next development I am always taking something from the past. I don't think I think some disasters, but anywhere what I can do better. I am trying to make it organized, less quick and dirty, more thinking about the future. It is built on very small conclusions all the time.</p>	<p>I do wish it would be a faster process for us, simply because we are both technical people and you know, three months can go like this, you are just talking to people not feeling progress, and once we know what we want to build, it feels like so much progress in a month, when you actually sit down and build stuff</p>

Appendix 11 Venture creation proces of digital platform (London & Beijing)

	Venture creation phases	Innovative platform venture creation process (London)	Innovative platform venture creation process (Beijing)
DIGITAL VENTURE IDEA	Digital venture idea	<p>We are a consumer engagement platform for retailers and brands. We leverage the mobile phone, the smart phone to create that data driven engagement between the retailer and the consumer. So, we are a little bit of FinTech, a little bit of RetailTech, a little bit of MarketingTech. It's all of the above, we are not strictly speaking a payments company, although you pay with our app with the phone, it's more a loyalty and marketing company. We use the payment as a trigger to a loyalty experience, which we only do in a digital world.</p>	<p>what we're doing now is to have an affordable remote translation solution we began was that we wanted to solve translation problems in China. So, we are a translation company but not a traditional one. What we began was a machine translation. So, we went to a lot of events where we could</p> <p>I had my phone I've logged into our platform, it's a web site, so you don't have to download anything. You plug your phone or laptop into the audio equipment, and then you saw streaming. And then we have our interpreters remotely interpreting.</p> <p>So, these couple of stakeholders, three at least, and organizers and interpreters and the audience.</p> <p>What we offer to an event organizer is that we are at least half the price. But we are flexible. We can do one hour, we can do 15 minutes. And we've done that. Also, we're going to save your audios and interpreted audios, the original and the translated.</p>
ANTECEDENTS	Previous experience	<p>We don't need to be trained or taught of these things, we have it, and therefore that accelerates. And it also helps not doing the fundamental mistakes on regulation ... it sure is good to have industry experience when the industry where you are is a complex one. The payments industry is a complex industry, relationships with retailers and their bank, the interchange that pays the fees, the merchants pay. All that stuff is complex. when you come from the industry you have a network, and everyone has one, because you need to like your network. So, after work you that proves very useful, if you happened to raise money, or you use their advice. But coming from an industry and trying to disrupt the industry, it's not a bad idea, because a) the fundamental knowledge you have is super important and b) the network.</p>	<p>my background is machine learning, so I did NLP, natural language processing. So, any interpretation itself. No, I did not. But in our team, we have a Chinese person, she has background in interpretation. She went to the university in that field.</p>
DEVELOPMENT	Development	<p>we had been brainstorming with mobile payment at Starbucks, Google Wallet, O2 wallet was not working, VISA had some wallet for e-commerce called wedot.me, which was a complete shamle. We had giants that didn't make it work. We started to look at Starbucks, what they are doing, and we had a moment of AH, that's interesting. So, what we did, we</p>	<p>We kind of always believed that we just go into the field and meet the people. It's a constant iteration process. To be honest, we don't know if the product we have now is the end product. Because we iterated one already. So, we started with machine translation, but we stopped the whole project in May. We worked on that for three months. Full time</p>

	Venture creation phases	Innovative platform venture creation process (London)	Innovative platform venture creation process (Beijing)
		<p>had another guy on the founding team, and he was a big consultant for a credit card company, and our other partner had to find a technology partner, some payment processing software, that could develop the first version of the app for us. So, we worked with these guys, and that was out-sourced. So, the first version of the app was beta-tested in one occasion in November/December 2013.</p> <p>In the meantime, we created a company and we raised initial capital we had an outsourced app. We didn't like that. So, we started to hire some engineers in 2013, in the beginning March. Know we started with a prototype in July, the summer it was with these guys, that our partner developed the first version of the app. That's when we launched the beta version, and then that's how we launched also the full version in January 2014. But in the meantime, we hired a number of engineers, 3 actually, one Android, one IOS, and one what we call the backend platform engineer. We've replicated the whole platform from scratch. We wanted to have everything in the house.</p> <p>During the Easter weekend 2014 we moved something like 4000 users from one platform (the out-sourced one) to our platform. The users didn't see it.</p> <p>So now we were on our own platform, and we started to hire more engineers and we started to sell our app to other organizations in 2014. Since September 2014 we launch, I don't remember exactly, but maybe 10 or 12 universities. And it was a great environment to launch, because in the UK universities tend to be big and have a lot of catering operations. So, this is actually quite substantial, and they in total they are 55 outlets, canteens, coffee shops, gym pubs, many universities have many campuses.</p> <p>here we accelerated the pace with the universities but also corporates.</p>	<p>like you know seven days a week. And we got that proto working, it was there and then we realized this is not the solution we want. And then we strapped the whole thing and started from the beginning.</p> <p>And then build a platform now, that we have, the site as I mentioned in the streaming platform. It's always been like this kind of iteration. So, we have really like one of our team, is the CEO of the company, he's really talented and good at going to the field meeting people. Like he goes there, test our product, gets feedback, and actively seeks for people and seeks different people and we try to push him wherever we can. We get feedback and then we analyse that, what are the opportunities here, what do we have, what are the costs of going to a certain direction. We do like week sprints will it's this kind of a lean development in certain sentence.</p> <p>Every week we have a meeting and then we think about what are our short term and long-term goals was what I said was for the week. And what is the easiest way for us to get to the long term and short terms goals. Things like in short term, we need income. We need to get someone to pay for our long-term goals. In long term we want to be huge scale we want to be a global platform that combines people. So, there's a lot of rambling along about.</p> <p>You have local companies, then you have locally global companies. What I mean by this, is that you have companies that are just working in Finland or in Germany, just there. And then you have locally global. So, you have global brands but they have these local sub divisions if you will. So, let's say for example YouTube, the biggest general YouTube channel is going to be Indian channel. I think it is called TSeries. And it's in Hindi. We are not going to be consuming that material in anywhere else than in India. So that's something that is stuck in this small circle. We want to push this, is that what we want to break those barriers between this. That channel, translates into any language. You can request it, that I want to consume this in my own language. So yeah, that's kind of what we want to build, what we want to push into. What we are doing now in the short term, is that we want to go into events and get even organizers to use our proto. We kind of get that baseline, baseline income that we can kind of grow from there.</p>

	Venture creation phases	Innovative platform venture creation process (London)	Innovative platform venture creation process (Beijing)
			<p>It's a process of understanding people, understanding, who needs us the most and now.</p> <p>And how we get income but also trying to understand the vision that where we think this should be going. We already had the vision, and you know, in May. Before May we thought we had the vision straight.</p>
	Funding	Probably a million dollars in that in that period. We raised another round, which we also called the C round. We raised another four million dollars in seven months. we were raised more money again in the early stage of 2015, we raised 10 million dollars.	Bootstrapping

Appendix 12 Venture creation process of digital ecosystem (Hong Kong)

	Venture creation phases	Innovative mobile app venture creation process (Hong Kong)
ANTE-CEDEMENTS	Digital venture idea	of the solutions where you can send value, money via mobile internet to anybody who has a messaging solution
	Previous experience	we are utilizing is the know how we got from our previous venture, when we were building mobile operating system, new CTO was CTO in our earlier company. The earlier company was founded 2012, so more than 6 years ago. We got to know each other there
DEVELOPMENT	Development	<p>The first year was, let's say searching for the user case to start with and we were pivoting quite heavily. We had multiple tries, we were visiting different markets discussing with multiple companies. This is a truly global company, Finland doesn't play any role in the beginning of this company, we are operating completely around the world.</p> <p>Our problem is that what we are developing is a platform. People are talking quite a lot about platform start-ups and so on. Actually it is very difficult to develop a start-up platform, because they are usually missing a user case, before someone is building a user-case on top of the platform. That has been our challenge, it makes sense to build a platform, because probably your success is higher, but then you have the problem, that you are not sure if you are solving somebody's real problems in the beginning.</p> <p>My way of build business, is very iterative. That's how I work, it's very stressful for other people and for the organization. But I take one direction and start looking into it, and I start testing it with customers, then finally I get understanding, whether this is a right direction or not. And then we pivot the way from that direction, if the feedback is that this is not going to work.</p> <p>Is this really a problem the customer wants to be solved? That's one question. Even as important is, are there already strong players on this area, who have solved that? Or do we have the capability to build this as our start-up resources? Because start-ups are clearly very limited on resources.</p> <p>It's quite complex situation when you are especially building something, which is not existing yet. Although it is extremely painful to have an iterative approach, I think it is necessary for success. As a probability game, if you are building totally disruptive, your probability to succeed is like, ok, we decided in the beginning that we decided to solve this problem, and will work next two years to solve that, the probability to succeed is less than two percent, I think. Because you just don't know if that is the right direction. That is why, if you have an iterative approach you can manage the probabilities and survive.</p> <p>Hong Kong is close to China and we were negotiating with Chinese partners. For our current venture Hong Kong is not that important. It is regulatory wise quite optimal for this kind of blockchain companies, it is loose with its regulations. Whereas for example Singapore is very strict, they define what you can do, and they execute that very carefully. Hong Kong usually doesn't say anything and they don't execute, unless you clearly break the local rules or something.</p> <p>Finland would be impossible, because Finland is also implementing and executing all the rules and it is not the most forward looking country in terms of disruptive technologies or blockchain.</p>