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Identifying Contributing Factors to Sustainability Awareness in the Norwegian Software Industry

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Abstract—During the last decade, cloud computing has grown in importance, popularity and user adoption across many industries. It offers various benefits to organisations; however, many are not aware of the valuable sustainability benefits that can be experienced when using cloud computing software. This research, through case study investigation of 10 accountancy firm clients of a Norwegian cloud computing software provider, aims to identify contributing sustainability factors that affect customer decision making when choosing whether or not to purchase cloud computing services. The views of 10 established Norwegian SME accountancy firms that use the case study organisation's services were captured through face-to-face semi-structured interviewing. Results indicate that sustainability awareness is of low priority among interviewed accountancy firms and that no sustainability factors were considered when choosing to purchase cloud computing software. In future, interviewees acknowledged that sustainability factors may affect their purchasing behaviour. It is, therefore, recommended that cloud computing software providers offer real-world insights to clients on how to become more environmentally friendly by using cloud computing.

Keywords—cloud computing; sustainability; environmentally friendly; service providers; Norwegian software industry.

I. INTRODUCTION

One of the last stages of the IT infrastructure revolution, which bloomed in the 1990s, was the development of cloud computing, which refers to a computing model where organisations use software solutions over the internet to obtain computing power [1]. The rapid growth of cloud computing over the past decade has changed the way many industries operate. This change provides companies with an opportunity to rethink the way they do business and accomplish a new and more sustainable long-term business focus. By moving traditionally paper-based business operations to the cloud, it allows companies to reduce their carbon footprint and increase energy efficiency and equipment recycling [2]. Furthermore, in recent studies [3], customer demand for sustainable products and services has increased supplier focus on producing sustainable outputs. Some researchers [4] also argue that by focusing on sustainability, businesses may gain competitive

advantage and build greater trust with customers, improving loyalty, word-of-mouth marketing and enhancing their ability to recruit more appealing employees. Looorback and Wijsman [5] further add that businesses that focus on sustainability develop renewed ambition and enthusiasm, as well creating a driving force for system transition among customers.

Cloud computing offers several well-known benefits to organisations, including flexibility, the ability to work from anywhere at any time, reduced costs, higher efficiency, mobility, easier sharing of documents and information with clients, as well as easier and quicker access to knowledge online [6]. However, many companies are not aware of the environmental and sustainable benefits of using cloud computing software, which not only benefits the company, but also the environment. Using cloud computing results in a more efficient use of resources and energy, resulting in less strain on the environment, making cloud computing a greener business solution for many companies [7]. At present, however, there is an ongoing debate in literature as to whether cloud computing is as environmentally friendly, as previously discussed. Di Salvo et al. [8] argue that cloud computing is environmentally friendly as it uses less electricity and, therefore, causes less strain on the environment, due to it requiring less global resources during implementation and operation. Conversely, Matthews [4] argues that, to be sustainable, cloud computing must use renewable sources of energy in order to be sufficiently sustainable, since cloud servers use a significantly large amount of electricity. This view is supported by Orfano [9], who argues that even though cloud computing provides a paper-free environment, to support the power consumed by electronic computing devices, more forests are now being chopped down. For companies wishing to adopt cloud computing, Yadav and Mulwani [10] identify a series of strategies that organisations can adapt to exploit the sustainable benefits that cloud computing software offers. These include: (1) encouragement and flexibility for employees to work from home to save energy on transportation and commuting costs; (2) reductions in hardware components, cutting energy costs for running and cooling of hardware and desktop virtualization; and (3) replacing face-to-face meetings with video and

conference calls. Moreover, customers have the option to identify and utilise cloud computer providers who use alternative energy sources to power their hardware, such as wind, solar or hydro power [11].

Internationally, sustainability is growing in importance. For example, in September 2015, The United Nations [12] launched their '17 Sustainable Development Goals' with the aim of ending poverty, protecting the planet and ensuring prosperity for all. Similarly, in 2017, The European Union [13] produced the EU Sustainable Development Strategy with the aim to "identify and develop actions to enable the EU to achieve a continuous long-term improvement of quality of life". It is also evident that companies that focus on sustainability gain greater market share and increase their competitive advantage [14].

To date, previous cloud computing research, such as [6, 15], has focused predominantly on its adoption, including the exploration of legal and ethical issues, with research relating to energy saving and environmental dimensions of cloud computing being scarce. Therefore, this research plans to answer the question: What sustainability factors will affect customers when they decide whether to use cloud computing services? We aim to identify if there is a need for increased focus and information concerning sustainability in relation to the use of cloud computing software. For the purpose of this study, sustainability awareness refers to an increased focus on environmental effects that cloud computing provides to become more environmentally friendly.

A. Case Study Organisation

This research adopts an industrial case study approach, working in collaboration with a Norwegian cloud computing software company (Company A) who produce and sell bespoke web-based Enterprise Resource Planning (ERP) systems that are delivered as a Software as a Service (SaaS) using cloud computing to Small and Medium-sized Enterprises (SME) in Norway. The company has a current customer base of 20,000 clients and aims to become one of the leading SaaS ERP system providers to SMEs in the world. In recent years, the company has played a significant role in the technological changes experienced in the Norwegian accounting industry and now prioritizes this industry as its main customer segment. As a supplier of cloud computing software, Company A is responsible for providing information to customers on the sustainable benefits that can be obtained when using their ERP system. Until recently, focus has predominantly been on highlighting benefits, such as efficiency, flexibility and lowered costs. However, reductions in energy consumption and other sustainable benefits, as a result of cloud computing, should be given greater emphasis.

B. The Norwegian Accounting Industry

The Norwegian accounting industry has grown significantly in the last decade, showing a 55.6% rise in sales

from 2007 to 2014 [16]. At the same time, the evolution of disruptive technologies, such as cloud computing, is changing the accounting industry and a report entitled 'Computerization and the Future of Jobs in Norway' [17] claimed that there is a 98% probability that the accounting profession in Norway will be digitalized in the future. This reinforces the importance of rethinking the way accountants work today as well as their role in providing services to customers.

The usage of cloud computing among Norwegian accountants started around ten years ago, but has increased in popularity over the last few years. There has been a significant change in the entire accounting system, from accounting standards, processes and staff; a trend that is expected to continue in the future. In 2010, Defelice [18] forecasted that by 2015, almost every accountant will use cloud computing systems and that premise-based software will not exist by 2020. This relatively drastic shift is caused by accountants now understanding the potential that cloud computing offers when it comes to efficiency, lowered cost and performance, which is particularly important for SMEs [19]. Companies operating in the SME segment find cloud computing systems especially valuable, because it is easier to share accounting information and provide correct financial information for decision making across an organisation. Traditional accounting systems tend to be large and complex, making it difficult to share information [20].

In Norway, the increased awareness of the importance of sustainability has been growing at personal, policy and organisational levels and has also had an increasing influence in the accounting industry. Lehman [21] argues that accountants, in future, could play an important role in responding to sustainability issues, such as global warming. This includes reporting and measuring the intrinsic and environmental value of commodities, instead of just its economic value. Accountancy firms should, therefore, not only report financial aspects related to their client's performance, but include social and environmental reporting as well.

The International Federation of Accountants [22] has recently emphasized the important role accountants can play in embracing sustainability challenges. Accountants can contribute to sustainability by developing a sustainable strategy and business model for their customers, as well as providing measurement of sustainability performance which are of value for stakeholders. Moreover, by doing this, accountants can contribute to increased business resilience and better business performance. However, in order to be able to measure non-financial performance, Eccles [23] argues that accounting standards for measuring such performance need to be in place. In contrast, Deegan [24] argues that incorporating measures of social and environmental performance are not something accountants should be concerned with or do, because accounting should only involve financial performance and 'numbers' to measure a company's performance.

II. METHOD

This research explores the awareness of sustainability among cloud computing customers from the accounting industry in Norway. The study will be limited to accountancy firms only, as this industry represents the largest customer segment of Company A. Our sample and method consists of 10, one hour, interviews with customers of Company A. This includes 2 x Female accountants and 8 x Male accountants, operating in Oslo, with various levels of experience. All customers interviewed represent an accountancy firm that can be considered an SME, with an average number of 250 employees.

Data was collected using an audio recorder and transcribed using Microsoft Word. All interviews were conducted in Norwegian and subsequently translated into English. To analyse the data, Nvivo was used to aid efficiency and identify key concepts and formulate suggestions for improvement. It is acknowledged that the size of our sample could be considered limited, however, this research should provide interesting findings relevant to the accountancy industry in Norway.

In total, 12 questions were asked to each interviewee. These included:

1. What does the word sustainability mean to you?
2. What role do you believe accountants can play in relation to sustainability?
3. What were the main reasons you decided to start using the cloud computing services of Company A?
4. Has Company A changed your role as an accountant?
5. Has Company A's technology helped you in any way to focus more/less on sustainability?
6. Does your company focus on sustainability in any way? Do you have any plans on how to become more sustainable in the future?
7. What does a normal working day look like for your employees?
8. Do you help your customers focus on sustainability? If so, how?
9. Are some customers more concerned with the environment than others?
10. Do you think increased focus on sustainability could help your business in any way? If so, how?
11. Would you increase focus on sustainability (environment) if it was better arranged/facilitated by Company A?
12. Do you believe the role of an accountant will change in future? If so, how?

III. RESULTS

A. What does the word sustainability mean to you?

As shown in the word frequency analysis in Fig. 1, most participants associated sustainability with the environment and the importance of sustainable development, including the use of alternative energies and preserving the planet.



Fig. 1. Word Frequency Analysis

Interviewees also stated that the word 'sustainability' meant something that could survive over time, was scalable, and did not use temporary resources.

B. What role do you believe accountants can play in relation to sustainability?

All interviewees stated that they had not considered this topic before. However, upon consideration, 8 out of 10 stated that using less paper was the most important contribution that accountants could make with relation to sustainability. Two participants stated that it was important to use available technologies and consider the environment in the office, such as using products that use less electricity.

C. What were the main reasons you decided to start using the cloud computing services of Company A?

The majority of participants stated that the main reason they decided to start using the services of Company A was due to it being online, flexible and they wanted to keep up-to-date with new technologies and gain the benefits associated with cloud computing adoption. Moreover, one interviewee stated that it was due to a change in their customers' demand and another stated that it was because of the possibility to work in the same system, but from different countries and using different devices, as they often had employees working from two different countries at the same time. No interviewees stated that sustainability or any environmental factor were considered or had an influence when choosing Company A.

D. Has Company A changed your role as an accountant?

6 out of 10 interviewees stated that Company A had changed their role as an accountant. The main reasons for this were due to the way Company A, through cloud computing technology, had changed their daily tasks, from routine work to more interaction and collaboration with customers. In addition, Company A had made traditional accounting tasks less time consuming and accounts felt that they are now more regularly updated. 4 out of 10 interviewees, however, said 'no' when asked whether Company A had changed their role as an accountant. The reason for this was that these interviewees and their companies already operated using similar cloud computing software solutions. One participant also stated that they had not seen any difference yet, due to the fact that they only started using Company A's solutions six months ago.

E. Has Company A's technology helped you in any way to focus more/less on sustainability?

7 out of 10 interviewees stated that the technology had not helped them to focus on sustainability in any way. The reason for this was that sustainability was not the driver behind why they changed to a cloud computing software solution. In fact, sustainability was not something they had thought about at all, which is similar to answers provided for Question B. However, even though interviewees initially responded 'no', the majority of participants stated, after consideration, that the technology had helped them become more environmentally friendly, but that this was an unintended outcome of working more online and using less paper. The remaining 3 interviewees stated that the technology had helped them focus more on sustainability, especially by, for example, using two screens and working electronically and not printing out documents.

F. Does your company focus on sustainability in any way? Do you have any plans on how to become more sustainable in the future?

9 out of the 10 interviewees concluded that their company did not focus on sustainability in any way. However, the majority required their customers to use Company A's software and equipped their employees with two computer screens to make it easier to work more efficiently and online at all times. One participant focused their answer on sustainability, stating that they had incentives for employees to be more sustainable; these included economic support if employees wanted to buy, for example, an electrical-bicycle to use to and from work, as well as transportation to meetings with customers.

G. What does a normal working day look like for your employees?

Answers to this question varied the most between interviewees. In general, all participants answered that they now, when using Company A's services, had the opportunity to be more flexible and that their companies allow employees to work from anywhere at any time. However, this practice varied. Some answered that their employees could decide for

themselves where to work from, as long as the work was completed. In contrast, some required their employees to be at the office at all times in order to support a social environment at work but, at the same time, provided flexibility if employees needed to stay at home. One participant highlighted the importance of a good 'work-life balance', which was made possible with a flexible system, such as that provided by Company A. Moreover, due to increased collaboration and engagement among customers, some stated that they are even more outside the office visiting customers, in order to maintain a good relationship. However, the SaaS solution provided by Company A had allowed for increased collaboration and new communication online, with automated processes, as well as an opportunity for customers to monitor the accountants more regularly, which reduces the need for physical meetings with customers. Still, a couple of interviewees highlighted the fact that a good relationship with customers was easier to obtain when meeting face-to-face and that a good relationship resulted in increased responsibilities.

H. Do you help your customers focus on sustainability? If so, how?

4 out of 10 interviewees acknowledged that they help their customers to focus on sustainability to some extent. This could be in the form of requiring them to use the software of Company A or other cloud computing solutions, as well as encouraging them to use electronic-invoicing. The remaining six interviewees stated that they do not help their customers to become more sustainable or require any of their customers to use Company A's services. Some even believed that it was their job, as an accountant, to adapt to their customers processes, and was not their responsibility to require them to use any specific system or help them increase their focus on sustainability.

I. Are some customers more concerned with the environment than others?

8 out of 10 interviewees could not identify any customers who were concerned with the environment. Two participants stated that their customers were concerned and considered the environment and sustainability in their business activities. One interviewee stated that women, particularly working in the beauty and cosmetic industry, were more concerned about the environment compared to other customers. Another participant stated that they had one customer who has an "environmental profile", meaning it is important for them to be environmentally friendly and consider sustainability in all of their business processes and activities; this required all communication and invoicing to be completed electronically; they also acknowledged that the customer had demanded that their accountant was environmentally friendly.

J. Do you think increased focus on sustainability could help your business in any way? If so, how?

5 out of 10 participants opposed the idea that an increased focus on sustainability could help them with their business, at least not in the near future. Four participants believed it could and that it would only become important in the future with relation to the increased attention towards sustainability and the environment. A common view shared by interviewees was that by focusing more on sustainability provides competitive advantage, which would attract new investors, customers and others with the same focus on sustainability. Moreover, some believed that focusing on sustainability is something that is, and will be, important for customers as well, especially those with a public profile.

K. Would you increase focus on sustainability (environment) if it was better arranged/facilitated by Company A?

7 of the 10 participants stated that they would increase their focus on sustainability, stating that if Company A had helped them be more aware of the importance of being sustainable, it would be positive and would have helped them increase their focus on sustainability. One way mentioned to do this is to write a blog post on the subject, providing information on how focusing on sustainability could be more cost effective and profitable, as well as providing the SaaS with new reports and dashboard functions making it possible to monitor how sustainable the business is.

L. Do you believe the role of an accountant will change in future? If so, how?

All interviewees, bar one, agreed that the role of the accountant would change in the future. This view was based on the introduction of new technologies, Artificial Intelligence (AI) and digitalization that industry is facing. Interviewees agreed that the role of the accountant will be more focused around advisory and expertise sharing tasks, requiring accountants to take on further education and training. The participant who did not agree thought that the role of the accountant would not change in a long time and that it was, therefore, not important to consider how it might change.

IV. CONCLUSIONS

This study was conducted to identify the contributing factors of sustainability awareness among accountancy firms in Norway who use the SaaS provided by Company A, as their cloud computing software solution.

As expected, sustainability, in relation to cloud computing and the usage of the SaaS solution provided by Company A, was not a familiar theme or something any of the interviewees had considered. Thus, sustainability awareness could be considered low. Interestingly, none of the 10 participants had considered the environmental benefits in using cloud computing when deciding to start using the SaaS solution; instead, they had chosen it due to it being: online, flexible and

up-to-date with new technologies. 7 out of 10 interviewees agreed that accountants could play a role in relation to sustainability; this demonstrates a belief that accountants can play an important role in accountancy firms becoming more environmentally friendly and focusing more on sustainability. Moreover, 9 out of 10 interviewees answered that Company A had helped them to focus more on sustainability. However, the increased focus on sustainability was only a side effect and not the main reason for choosing the Company A's cloud computing solution. These results confirm that in order to increase sustainability awareness amongst accountants, there is a need for an increased focus and information concerning sustainability in relation to the use of cloud computing.

It is evident that the accounting industry is changing and accountants must find new ways to assist and work with their customers in order to survive. Companies still heavily rely on their accountants with relation to accounting advice, as well as other recommendations regarding business performance, which gives accountants an opportunity to strengthen their role as a trusted advisor. Research shows a growing focus on sustainability in business in general and combined with increased requirements from governments, sustainability reporting is likely to become an integrated part of the accounting process in future. Cloud computing suppliers, such as Company A, have a responsibility to facilitate these changes, as well as being the driving force in the shift towards increased sustainability awareness.

It can be seen from this research that the ability to adapt will also be important, both in terms of new technologies, such as cloud computing and AI, as well as new standards related to reporting and how companies measure their business performance. Organisations who have already adapted and started to take advantage of new technologies seem to be performing better when compared to others who are not yet willing to adapt. In future, adapting to these changes will be inevitable, in terms of future growth and success, and a competitive advantage is possibly obtained by following these trends, in favor of the companies already implementing them. Company A should see this, therefore, as an opportunity to implement a sustainable strategy in order to achieve increased competitive advantage. In future, businesses are most likely to seek suppliers who have a sustainable image. Company A should provide information about how to become more environmentally friendly by using cloud computing software, as well as supplying their software with possibilities for their customers to become more sustainable.

A. Future Work

As previously acknowledged, the sample size of our study could be considered somewhat limited, providing a narrow focus to the accounting industry in Norway only. In future, this research could be extended to include other industries to identify if sustainability awareness is higher or lower. It could also be possible to conduct a comparative analysis to contrast the differences in awareness between two or more companies.

Moreover, a longitudinal study, whereby companies are studied over a set period of time would be beneficial in observing the rise in sustainability awareness in one year or more.

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