

Exploring the Challenges Faced by Small and Medium Sized Enterprises When Adapting to Technological Change

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ABSTRACT

Small to medium sized enterprises account for the majority of firms on a global scale and play a vital role in the provision of goods and services. Nevertheless, SMEs often lack the means to react effectively to the rapidly evolving technological landscape, which in turn can lead to their demise. This paper aims to highlight the potential shortcomings SMEs can face when adapting to technological change with the intention of making firms aware of the associated challenges. In order to identify the key challenges, a systematic literature was done as well as an in-depth case study with 4 different SMEs. The most frequently encountered shortcomings were financial, skills and knowledge as well as time challenges. However, discrepancies between theory and real-world SMEs have been identified and this paper aims to cross-reference such problems and therefore develop a framework that will provide a comprehensive overview of associated challenges for SMEs. As such, shortcomings can be prevented and planned for so that SMEs have the best chance for survival in their domain.

Additional Key Words and Phrases: SME, shortcomings, technological change, adaption, ICT, and challenges

1 INTRODUCTION

Small-to-medium sized enterprises represent the backbone of an economy [11] and responsible for the provision of products and services. SMEs can be found in every sector and are responsible for employing a large proportion of the workforce [19]. Nevertheless, competition among SMEs is fierce and often technology and innovation remain at the forefront of their existence. Failure in terms of adapting to technological change can lead to poor economic performance and often the demise of an SME's operations. Hence, the need for emphasis and awareness in terms of potential challenges that may arise regarding technological change.

Managers and entrepreneurs are constantly striving to make their businesses more successful and therefore have to take calculated and strategic decisions to help mitigate any challenges that can come along the way. Dynamic capability theory focuses on doing the right things at the right time from a firm point of view and to gather, renew and enable as many resources as possible [24].

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Being 'dynamic' in terms of ability and resources is an advantage SMEs posse due to their smaller size and their ability to focus and re-channel efforts. Nevertheless, SMEs may lack the knowledge and experience to foresee shortcomings.

Identification is the first step in prevention; this study aims to highlight the challenges SMEs face when adapting to technological change. By acknowledging and identifying such issues internally, SMEs are able to foresee and adapt their digital strategies accordingly. Fine-tuning the digital strategy allows SMEs to incorporate potential deficits into their planning and prioritise on what matters most. Moreover, previous studies have highlighted the various shortcomings SMEs might encounter when adapting to technological change; these include, security concerns [8], high implementation costs [2], and lack of technical skills [26]. However, of the studies found in the preliminary exploration, few have cross-referenced their findings with real world SME data, thus, creating a knowledge gap regarding the applicability of the results. An in-depth literature review will be conducted as well as comparisons between the case companies' digitization strategies and associated interviews, with the intention of solidifying the theoretical findings and developing a framework with the identified shortcomings. The case companies consist of local SMEs from diverse industries (IT, marketing, restaurant, etc) all having the intention to strive and remain profitable.

2 PROBLEM STATEMENT

Despite the plethora of research conducted on SMEs in terms of the challenges associated with adapting to technological change, few studies have compiled and cross-referenced their theoretical findings with multiple real-world SMEs. After understanding the problem at hand, a main research question can be deduced, as well as three sub questions.

2.1 Research Goal

The main purpose of this research is to raise awareness about the challenges SMEs face and to see both whether they have been able to identify such challenges and if they incorporate them into their future digital strategies.

2.2. Research Questions

Analysing the problem at hand and the goals of this study have led to the formation of the following research question:

2.2.1 Main Research Question: *How can SMEs best anticipate the challenges associated with technological change?*

In order to answer the main research questions, it is key to look at what these challenges are and whether the case companies have

encountered them. Likewise, a look into the existing digital strategies of the case companies will give indications in terms of awareness and planning relating technological challenges.

2.22 Sub Question 1: What shortcomings can SMEs face when adapting to technological change?

2.23 Sub Question 2: What challenges have the case companies faced when confronted with novel technologies?

2.24 Sub Question 3: How do the case interview results compare to the case companies' digital strategies?

3 METHODS OF RESEARCH

In order to address all the associated research questions, the research will be divided into 3 main parts, each leading on to another. Firstly, a literature review will be conducted in order to identify and categorise the challenges, answering SQ1. The identified challenges will shape the interview structure for the case companies, which in turn will answer SQ2. Lastly, the interview data partnered with the case's digital strategies will help identify trends regarding knowledge gaps or potential blindspots SMEs can develop when adapting and planning around technological change therefore subsequently also answering SQ3.

3.1 Method for Answering SQ1

This section of research refers to the in-depth literature review that was conducted in order to identify the most common challenges SMEs face when adapting to technological change. Grounded theory as a literature review method was adapted from the works of Wolfswinkel et al. 2013, where studies were categorised and key themes were compared [27]. The search query predominantly took place in Scopus, with secondary literature being taken from Google Scholar.

TITLE-ABS-KEY (((challenges OR problems OR barriers) AND (technology OR digitization OR ict) AND (adoption OR adaption) AND (sme OR smb)))

Articles were sorted based on topic relevance and title, if relevant, the abstract was read as well as the key words, after that, the paper's content was analysed in depth. The number of citations and the fact that the papers must be peer reviewed was kept in mind throughout the searches. Papers of relevance were included in the literature review matrix and a search for new papers continued until all necessary literature was found.

3.2 Method for Answering SQ2

Working with the cases provided, data regarding perceived challenges will be collected in the form of an interview. This will be done in order to cross-reference our literature findings with real company data and to identify gaps or consistencies. The interviews will be semi-structured in nature in order to allow elaborations on specific answers if need be. The predetermined questions will be based on the key challenges identified in the literature study. Representatives from the technology/ management department will be interviewed with the assumption that they are most knowledgeable in terms of the problems the company can face. The qualitative data will be collected via a recording device and be analysed for patterns and recurring themes in order to help answer the second sub question. The case of one SME will be compared with the cases of other SMEs as well as with literature findings and

interviews. The works of Yin regarding case study theory offer great grounds to establish multidisciplinary use of such case studies [28] and is an excellent method at identifying relationships between phenomena that are not made explicit [28] and has been used for inspiration throughout this section.

3.3 Method for Answering SQ3

All the case companies have submitted a digital strategy document based on a digital strategy canvas [22] addressing ways to engage, enable and evaluate business strategies [22]. These digital strategies provide insight on how the case companies plan for change in terms of changing technology. Analysing the digital strategies with the literature findings can help identify blind spots in the firms' strategies and identify the categories that have the least consideration. Likewise, comparing the digital strategies with the interviews can help bridge the gap between awareness and action as well as find out why some challenges were noticed but not taken into consideration in terms of planning. This all assists in ranking the identified challenges in terms of validity and applicability.

3.4 Method for Answering Main RQ

Once all the necessary literature has been identified as well as the interviews/case digital strategies analysed, challenges can be ranked and backed with company data in order to build a framework looking into preventing such challenges. Prevention through awareness will be the goal moving forward towards answering the main research questions so that SMEs can best anticipate such challenges. If SMEs are aware of the challenges associated with technological change and take action accordingly, they can be outright prevented.

4 RESULTS OF THEORETICAL FINDINGS

This section will look into the results and the analysis of the theoretical findings identified from the literature review.

4.1 Literature Review Results

Concepts describing the general problems were used as research topic and the shortcomings identified in a two-decade literature review on SME technology adoption barriers [23] have helped shape and identify the relevancy of the challenges. Upon examining the extensive literature available, the most prominent shortcomings have been identified and checked. Such shortcomings have been tallied and have been used as base points for the development of an overarching framework displaying the overall classification of challenges SMEs face. Table 1 contains the categorized findings of the literature review. It includes the identified challenges and the number of times these challenges appear throughout the chosen literature pieces. The frequency row refers to the tallied score of the challenges.

4.2 Costs and Financial

Adapting to technological change can oftentimes be costly, whether SMEs lack capital or have the inability to allocate funds, it can lead to decreased levels of output and ultimately their demise. All papers 15/15 mention costs as an encountered challenge when incorporating new technologies within their business processes. Investments are needed to make technologies work [15] and costs relating to maintenance and training remain high [18]. Therefore, lack of financial resources often tends to slow down the adoption of ICT in SMES [10] therefore influencing the bottom line.

	Costs and Financial	Skills and Knowledge	Technology	Organisation /Management	Government Support/Policy	Security	Time
[15]	x	x					x
[5]	x	x			x		
[25]	x		x	x	x	x	
[10]	x	x	x	x	x		
[12]	x	x	x				x
[6]	x	x	x	x		x	
[4]	x	x	x	x		x	
[20]	x	x	x	x			
[18]	x		x	x		x	
[16]	x	x	x				
[21]	x	x			x		
[3]	x	x	x	x			
[13]	x	x			x		
[1]	x	x	x		x	x	
[9]	x	x	x				
Frequency	15	13	11	7	6	5	2

Table 1. Representation of Literature Findings

4.3 Skills and Knowledge

Learning to work with new technologies can often be time consuming and finding skilled workforce is oftentimes just as challenging. 13/15 papers mention skill and knowledge as a challenge and that a lack of employee skill can have an influence on how effectively ICT is used in SMEs [5]. Among Polish SMEs, lack of knowledge was reported as being the “most significant barrier” to the adoption of technologies [6]. Nevertheless, a study on cloud ERP adoptions by SMEs [25] refers to “capability” as being a key challenge, however it links capability with technological compatibility rather than skills and knowledge, even though it takes domain knowledge to integrate technology successfully in a compatible manner.

4.4 Technology

With innovations in ICT leading to increased performance and productivity [4] challenges can arise when the current ICT infrastructure is lacking [4]. Whether that be incompatible legacy systems or slower existing hardware, SMEs can often be discouraged to make investments in new ICT implementations. System integration, testing and management have been noted as being of concern for enterprise resource planning implementation [3] and if not up to date, it can lead to inefficiencies among the workplace. Moreover, technology can offer SMEs a competitive advantage [16] as they can innovate or excel with the use of specialised tools and be ahead of the competition within the SME world. Nevertheless, despite facing adoption challenges, some SMEs see no need to upgrade their current systems [18] which can

be interpreted as a budgeting measure for increased business agility, hence, why only 11/15 studies reported technology as being a challenge.

4.5 Organisation and Management

Management support is essential in defining norms and values and is thus correlated to technology adoption success [18]. Managers may sometimes not understand the benefits of new ICT systems [20] which can lead to poor decision making and ineffective implementation of solutions. Likewise, managers may lack the training for leadership roles [3] and may end up causing conflicts during the implementation due to mismatched skills and expectations [3]. Nevertheless, less than half (7/15) of the papers reported organization and management as being an issue. This could be attributed to the fact that papers take skills and knowledge as an overarching theme for organization and management suggesting challenges attributed to management are often due to decreased levels of training and skills throughout the organization.

4.6 Government Support and Policy

Support from governmental agencies through favourable policies and schemes is key for SME development and lack thereof can pose a challenge. A study on Malaysian SMEs identified a lack of detailed frameworks regarding policies for SME development as well as challenges in terms of loan/grant access [21]. Moreover, due to the slow nature of IT law development, it can fail to encompass rapid technological changes and therefore create blind spots in upcoming legislation [10]. Nevertheless, the amount of government support SMEs receive is dependent on their geographical nature and may not be the case for all areas, which could explain the only 6/15 studies that mention it as being a problem.

4.7 Security

The issue of trust in the new technologies is a prominent one; the topic of security refers to how well internal data is handled [4] from a systems point of view, this can evidently have effects on internal and external processes. Likewise, a study on Yemeni SMEs reported concerns with ICT infrastructure [1] in terms of its security. Despite the challenge ‘security’ only being mentioned 5/15 times, security is deemed as a technological factor [25] and goes hand-in-hand with the existing state of the SMEs ICT infrastructure.

4.8 Time

Time was reported as being a challenge as SMEs are generally busy running their everyday affairs and find it difficult to allocate time for projects and technologies [12]. Similarly, a study on industry 4.0 adoption mentioned it has challenging to allocate time to new technological developments [15]. Nevertheless, only 2/15 studies mention time as a major challenge. On one hand SMEs can be flexible in terms of allocation of resources; or, time constraints are often implicit and not made obvious and hence not specifically stated as a challenge. All resulting in time being a challenge that has very little description and analysis.

4.9 Strengths of SMEs

Despite the potential challenges SMEs can face, there are certain strengths associated with firms of smaller nature. Being more flexible allows SMEs to make decisions faster and adapt to a rapidly changing environment [7]. The term flexibility can also allow for more improvisational practices [7] adding to the dynamic structure

of SMEs as well as enhanced communication among members in a team. Moreover, SMEs have the benefit of adapting their business model rapidly in order to identify niches in the market and cater to specific market needs [14]. Retaining and connecting with customers is also a strong-point SMEs have as they can often tailor their customer resource management (CRM) strategies to individual needs [17], all painting a solid picture of the advantages SMEs have over traditional, large multinational businesses.

4.10 Literature Review Conclusions

From the literature review, the most frequently occurring challenges have been identified and ranked. Financial challenges are most encountered followed by skills and knowledge and then technology concerns. These can be seen as the main challenges faced by SMEs when adapting to technological change. Organizational challenges, lack of government support and security challenges have ranked lower than the above, however still remain a potential barrier for SMEs. Nevertheless, the challenge of time was reported in very few literature studies, ranking last in terms of frequency, almost classifying it as not a relevant challenge. In later sections, this information will be cross-checked with data inputs from case SMEs and their digital strategies.

The main problems of costs, skills and technology could be the root causes of other secondary challenges such organizational shortcomings and security issues. Likewise, poor government support may result in decreased accessibility to capital resulting in financial troubles. All the identified challenges have a certain degree of influence on each other and all can appear as challenges in the way of technological change.

5 INTERVIEW AND CASE ANALYSIS

The case companies have been interviewed for information regarding the challenges faced when undergoing a digital transformation. Comparisons will be made with their digital strategy booklets in order to identify any gaps or key elements taken into consideration.

5.1 Case 1: Software Vendor Company

Being a technology company means overcoming and adapting to change regularly. With the focus on e-commerce and distribution, challenges relating to growing and scaling up as a business are prominent.

From digital strategy and interview, a great focus is placed on costs and return on investment (ROI), every purchase or upgrade has to help the bottom line which in turn helps make the company more profitable. The company mentioned that they compare prices often to find the best solution and use new technologies to monitor ROI. Emphasis was placed on concern regarding cost of resources and capital.

In terms of skills and knowledge, challenges are faced when hiring new staff as they need to be trained with regards to implementation. Time was another challenge that was frequently encountered, whether that be spent on research, development or implementation, the time frame and plan were mentioned as being complex efficiency related problems.

One of the largest challenges as mentioned in the interview has to do with organization and management. How can management scale

the business for growth? New solutions in combination with novel technologies need to be in place in order to sustain business growth and achieve objectives. An organizational plan in terms of how management will facilitate growth and development was however missing in the digital strategy.

The challenges regarding government support were not present as based on innovations and digital security, certain benefits can be obtained. Nevertheless, as mentioned in the digital strategy, attention needs to be paid to General Data Protection Regulation (GDPR) as legal problems can arise if not adhered to. Security in terms of technology also proved to be a challenge as being an online vendor places them in a vulnerable position for online fraud and governments are also putting pressure for added security among their platforms.

5.2 Case 2: Café Company

Despite having a more traditional business model oriented around service, technological change throughout the company has brought many advantages as well as posed some challenges.

From the interview, various challenges were brought up regarding the adaption to new technologies. For example, phones, registers and accounting systems proved to be costly and money was spent trying to find out which solution fit best to the current technological suite. Payment for licenses was also reported as being a financial challenge as for every new device, investments in new licences were needed. The digital strategy also takes into account new technologies, mentioning the benefits of upgrading the current system and referring inefficient technology use from the previous billing system.

Employee skills was identified as a challenge in terms of getting up to speed with new handheld devices and systems. Shortcomings regarding the learning curve for the new accounting system was mentioned in the interview as well as the need for investments in specialized trainings for employees regarding new technologies.

In terms of organization and management, large amounts of time were spent in researching best practices and technologies for the business, such as comparing specifications and prices of various ICT systems. Despite time being a scarce resource, a specific time plan in the digital strategy was missing, which could suggest that often times activities take longer to complete than initially anticipated, as confirmed by the interview.

In addition, security was not mentioned as being a challenge as the technologies being used are not highly complex, and technical background employees have previously given a greenlight for the system in terms of security. Government support proved to be a challenge as no subsidies or incentives were provided for upgrading the existing technology ecosystem. A gap in terms of external support was identified and from the interview it was suggested that SMEs in collaboration with the local government should help each other through information and resource sharing.

5.3 Case 3: Digital Marketing Firm

Being in the competitive industry of content creation and marketing requires effective and innovative uses of technology in order to stay afloat. Being a smaller firm in terms of employee size, costs and financial concerns were of priority. From the interviews,

it was mentioned that knowing where to allocate funds proved to be a challenge as expanding and investing in new technologies often means reducing costs elsewhere. It was also mentioned in the digital strategy that the firm has a limited budget for new technologies and that is probably best to optimize their current suite rather than to invest in new technologies.

Skills and knowledge in terms of employee ability was not mentioned as a challenge since the employees were relatively young in age and the small team was very agile and tech savvy. Nevertheless, it was mentioned in the digital strategy that the firm experienced difficulties recruiting new employees, however a plan regarding recruitment was lacking.

The firm working on a contract/need basis did not experience time issues and generally had sufficient slack in schedule to address and overcome any technical problems that may have risen during a digital transformation. Time however was a challenge that was not explicitly mentioned in the digital strategy and could evidently lead to shortcomings if not managed well.

Minimal government support was present in assisting technology adoption and there was no mention of tax incentives or subsidies. Working primarily with personal data a major challenge was overcoming the legal issues of GDPR as mentioned in the digital strategy. Therefore, resulting in the creation of data security challenges in terms of handling and storing data properly.

In terms of technological challenges, few were identified, mostly due to the use of open-source APIs and minimal or no-code solutions. In the digital strategy, emphasis was placed on using existing technologies in more efficient ways, for example better ad-strategies and use of social media; rather than investments in newer more complex systems.

5.4 Case 4: Constructions Company

From the interviews, it was made clear that this company was aware of the challenges that may come up when faced with technological change. Nevertheless, some hurdles were still in the way; currently implementing a new IT system, concerns regarding technology were present. Issues such as system downtime and difficulty transferring files/information from legacy systems were encountered.

Time was also a challenged faced as the ICT project took longer than expected to carry out. Time played a role also in training employees to operate the new system, which had an impact on the ability to retrieve files and satisfy customer needs on a timely basis.

Their digital strategy has identified the fact that skills may be lacking when it comes to the use of digital information systems and emphasis was placed on education and training as being an integral part of management. Likewise, in the digital strategy, the need for new technology was highlighted being important since it was not being used efficiently for more simple tasks.

Nevertheless, when interviewed regarding government support, subsidies played role in helping the digital transformation, a section that was not mentioned as part of the digital strategy. These have helped reduce costs and provided incentive to refresh their current IT system and ease business operations.

The security of their ICT system was of concern as handling customer data safely is a priority for the company. Likewise, the adherence to GDPR and other governmental regulations are also topics of concern for the firm. A section in the digital strategy on internet of things and motivating the staff to go digital was a key identifying factors in pushing for a more connected company. Nevertheless, from the interview and digital strategy, the company is aware of potential challenges and steps are being taken towards prevention and planning ahead.

	Costs and Financial	Time	Skills and Knowledge	Technology	Organisation /Management	Security	Government Support/ Policy
Case 1	x	x	x	x	x	x	
Case 2	x	x	x	x	x		x
Case 3	x	x			x	x	x
Case 4	x	x	x	x		x	
Frequency	4	4	3	3	3	3	2

Table 2. Representation of Interview Findings

5.5 Interview and Case Conclusions

From the interviews with the case companies and the information identified in their digital strategies, several conclusions can be deduced. Cost and financial challenges remain at the forefront of encountered difficulties. However, the challenges associated with time were present in all the case companies' documents and interviews, matching the level of financial challenges. Moreover, skills, technology, organization, and security challenges are all encountered by more than half of the case SMEs being in a middle ground in terms of problems. Nevertheless, lack government support and policies was reported the least number of times, with half reporting that as being a struggle faced when dealing with new technologies.

The digital strategies of the companies included some information regarding how they would tackle challenges associated with technology adoption, however, many were lacking detail as well as the outright identification of such problems. The interviews along with the digital strategies of the case SMEs have identified the challenges the case companies face along with how in-line their digital strategies are with the situations they find themselves in. All of which help answer research questions two and three.

6 ANALYSIS AND CONCLUSIONS

From the literature review and the case companies, similarities as well as differences can be seen in how the challenges associated with adapting to new technologies are categorised.

Both the literature review and case studies confirm that cost and financial challenges were among the most encountered in terms of dealing with technological change. Money in general terms is required throughout all stages of a project as well as in every organizational department and lack thereof may hinder the developments in terms of future proofing. From this, we can confirm that financial challenges are a core challenge for SMEs

when adapting to technological change. Lack of finance and capital can result in knock-on effects and lead to the creation of various other encountered challenges. For example, it could lead to decreased accessibility to new technologies and decreased levels of technological security. Likewise, decreased funding towards training of employees can hinder their skills and managers may not have access to sufficient assistance when working, creating a vicious cycle internally in a company.

On another note, the challenge of time plays an interesting role in the findings of this paper. From the literature review, it does not appear as being a relevant issue, since it is only cited in two papers. In contrary, all the case companies mention time as being an issue they faced, both internally and externally when it comes to adapting to new technologies. This categorised time as a 'wild card' since it comes as having polar opposite results when compared from theory to reality. Time is a challenge that may often go unnoticed and is often implied. If a firm is struggling with getting finances or training workers, time is often an encountered reason or justification as to why things are not being done; as such, acting as a barrier inhibiting the progress of the firm. The challenge of time may have been underestimated in the literature reviews due to it being often a general and broad challenge that can often go unnoticed in the daily operation of an SME when viewed from an analytical perspective. However, when interviewing employees hands-on, time is a constant pressure present at the workspace.

Nevertheless, time should therefore be considered as a core challenge encountered by SMEs as it can often be traced down as the root cause of other mentioned problems. For example, time pressures may inhibit SMEs from gaining access to capital or not allow firms to train employees or managers to learn new skills. Likewise, time constraints may also allow for decreased amounts of research into new technologies and more secure ones, therefore resulting in technological challenges as such. It should be mentioned that due to an SMEs small and flexible nature, often resources can be shifted with decreased amounts of bureaucracy to target root causes and therefore allocate more time to core problems.

Shortcomings associated with decreased levels of government support and policy challenges are present in the 'middle ground' of the literature review, however, half of the case SMEs have not encountered problems as such and therefore ranks last on that list. Government support can offer incentives and financial benefits for SMEs which in turn could solve some of the challenges associated with financial troubles. Moreover, local governments may offer training courses to educate workers and managers. Governments can also pose many barriers that are detrimental for SME development and that can cost both time and money, however, these barriers are often local or on a country basis. Of the case companies, all conduct business in the European Union and are all Dutch registered SMEs. This means that they have part of local restrictions and regulations associated with growth and technological development. On the contrary, the literature review contains information from a broad variety of countries with some focusing on African and Asian SMEs. This could explain the discrepancy between the literature findings and the case findings in terms of perceived government support. From this, it may also be implied that the Dutch government provides more incentives and has resulted in the creation of less challenges in this regard.

Decreased levels of skills and knowledge have been challenges identified in both the literature review and case study and have ranked highly as a potential shortcoming for both. Problems such as decreased efficiency and poor output can be traced back to not knowing how to do tasks well and or not receiving correct levels of support. A connection can be made with organizational and management challenges as providing access to trainings is often down to managers and high-level decision making can also be troublesome if managers lack the skills, knowledge, and experience to run an organization. Poor management can also result in financial and time problems as well as technological and security concerns if implementations are done improperly. Therefore, skills and knowledge play a significant role in organizational success and should be highlighted as a core problem when it comes to adapting successfully to technological change.

Security challenges have ranked in similar positions in both the literature review and the case findings. Such problems usually originate from technological challenges associated with either legacy systems or governments placing pressure on firms to have increased levels of data security throughout their ICT systems. Security may sometimes be overlooked in practice as it is often assumed to come along with systems and is generally present but not significantly explored either due to time or interest constraints. Technological innovations can result in increased efficiency and SMEs are in a unique position where they can experiment with novel technologies in order to solve various problems. Another problem to consider is the fact that technology generally takes a long time to improve and reach the market, therefore, it might be hard to change and improve the technology in a company. Skills and knowledge can help in regards to working with novel technologies but often technological improvements are irrespective of budget and time allocation. Nevertheless, technology and security challenges would not be considered as core challenges as they can often be resolved as a result of better performance in one of the 'core challenges' categories.

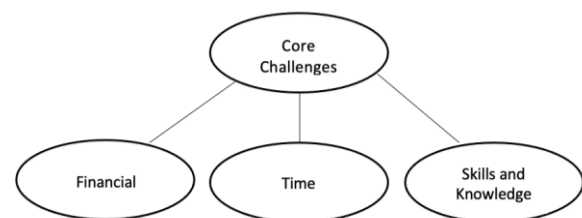


Figure 1. Representing Core Challenges

From the above, after analyzing and cross-referencing findings between the literature and the case SMEs, challenges can be categorized into core challenges and secondary challenges. This means that SMEs should allocate more resources into solving core challenges such as financial, time and skills. These would be the challenges that are at the core of future planning and are the more general root cause of problems. Core challenges can cause secondary challenges for example lack of financial resources can mean less investment in security. Likewise, addressing a core challenge can mitigate a secondary challenge, for example, having

more training programs for skills and knowledge can result in organizational and managerial gains.

The secondary challenges are ones that can be caused by the core challenges or serve as other focal points for SMEs to priorities on. Such shortcomings should also be included in future plannings and digital strategies as they can often end up resolving each other if one or more issues are addressed. The script can be flipped, and the secondary challenges can be looked at in a way that these can also be methods for solving core challenges, as government support and technology can solve financial and time challenges for example.



Figure 2. Representing Secondary Challenges

All-in-all the challenges identified both in the literature review and the case studies can help firms identify early on potential challenges and plan ahead in order to manage their negative effects or prevent them outright from occurring

7 DISCUSSION

It should be noted that due to the diverse nature of the case SMEs, different weights and degrees of importance can be associated with the challenges. For example, the café company may not place significant weight onto technological challenges as would the digital marketing firm. This means that the confirmations from table 2 may mean different things depending on the SME, the degree to which they experience the challenges or the degree to which it affects them is also relative and difficult to quantify in such a manner. The figures are however useful as a visualization of the challenges in terms of importance and relationship.

A proposed solution to help mitigate the identified challenges could be increased collaboration among SMEs. If SMEs are willing to share knowledge and resources, others SMEs can bring products to market quicker which in turn helps all parties in a circular economy. Governments could also intervene and have schemes in place to encourage SMEs to collaborate together and have plans for shared resources and increased communications. Collaboration also saves time resulting in quick messages being sent out between firms or shared knowledge resulting in quicker more streamlined production. All of core challenges may be solved through increased degrees of collaboration among SMEs and should therefore be seen as an important stepping stone for future growth.

8 FUTURE RESEARCH

Expanding on this research provides great opportunity to take things further with possibility to enrich both the literature and case information. More companies can be interviewed for details regarding their processes and management of the mentioned challenges. Moreover, a survey can be developed and sent out to SMEs on a global in order to benefit from more reach and valuable input data. Getting to know the companies in great detail can uncover useful information on how these challenges impact SMEs and the role of technology in their business operations. Studying the challenge of time can provide great benefit for SMEs as it has been a concept that seems to be overlooked from a literature perspective. In order to broaden the understanding of the identified challenged, a future expansion point can be the creation of a causal model describing the causal mechanisms between the identified challenges as well as identifying clear dependencies and interdependencies between the challenges.

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