

Key Challenges Faced by Irish Small and Medium Enterprises in Digital Transformation Post Covid19

A Dissertation presented by

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ABSTRACT

Digitalisation has revolutionised the world, creating benefits from digital data to support business growth (Parida, 2018). However, in the digital transformation process, the companies confront many challenges to successfully reach the digital objectives imposed upon them (Ng, 2021). Since the pandemic arrived digital adoption has increased (McKinsey, 2021) in an inadequate manner therefore this disorganised digital transformation strategy drives the company to fail (Boston Consulting Group, 2020) & (Ng, 2021). Vial recognised that digital transformation impacts organisations at every level (2019) and Rueckel, Muehlburger, and Koch (2020) developed a facilitator digital transformation factors framework that represents the four organisation layers such as Normative, Strategy, Tactical, and Operational and the manner how each of them impacts in the digital transformation process. As a result Organisational values, Management capabilities, Organisational infrastructure, and Workforce capabilities have their own digital transformation factors and elements (Rueckel *et al*, 2020) that need to be under inspection and control to align the company into the successful digital adoption process. This study is exploratory in nature aiming to examine the four organisational categories in the Irish small and medium enterprise (SMEs) and determine the key challenges in digital transformations that organisations are confronting. The study was developed as a mono-method qualitative approach. The primary data gathering instrument was semi-structured interviews and it is limited only to the company level. Organisational values and Management Capabilities imply vital factors driving the organisation toward the constant change that digital transformation brings. Therefore a scarcity of digital transformation values and vague digital leadership role is going to be more difficult for the adoption process.

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CHAPTER 1 INTRODUCTION TO THE SUBJECT AREA AND THESIS

1.1 Background to the study

1.1.1 Digitalisation

The advantages of digitalisation are now universally understood and accepted by businesses, and they are frequently viewed as important in a dynamic business climate. However, especially among small and medium-sized businesses, the amount of digitalisation is still below expectations (Tick, Saary, and Karpati, 2022). Nowadays businesses are encouraged to play in global markets to follow the increasing trend that had a peak during the pandemic period (Mckinsey, 2021). However, SMEs must understand the generated benefits from digital transformation and the set of norms needed in the adoption process to avoid failure.

1.1.2 Key elements in the adoption of digital transformation

There are a bunch of elements that can drive the company to succeed the digital transformation and to avoid the unpleasant experiences during the adoption process, because of the lack of understanding how digitalisation impacts the company at every level (Nwaiwu, 2018) & (Vial, 2019). These vital elements give direction in the conditions that companies must have to create at every level in order to succeed.

Boston consulting group reported that only 30 percent of companies that started the process have had success in digital transformation (2020). The low rate is because the absence of many enabling factors in the strategy plan to embrace digital transformation (Ng, 2021).

1.1.3 SMEs conditions in digital transformation

According to the OECD (2021), seventy percent of SMEs worldwide increased the use of digital technologies within their business during the pandemic. However, the use of technology is not of much use if the sets of skills are not updated (Barreto and Leomar, 2021).

In the Irish context according to the European commission (2018), Ireland rank in sixth place in the Digital Economic and Society Index in 2018 report (DESI) by contrast, EU's Digital Intensity Index (DII) (2020) reveals a large majority of Irish enterprises with at least ten people employed

having a scarcity of digital technologies (Eurostat, 2021). Additionally, according to the OECD (2019), Irish businesses have performed worse than international businesses over the past ten years, and the performance gap is widening.

1.1.4 The urgent necessity for digital transformation

There is a vital message from The Commission to the European Parliament aiming at a digital decade by 2030 and its ambitious vision is to build a digital society (European Commission, 2021) also a digital transformation agenda from The World Economic Forum proposes to upgrade vital aspects to support global competitiveness and enhance the markets of tomorrow (Schwab, Zahidi, 2020). In addition, the change in customer behavior after the pandemic demands more digital products (Mckinsey, 2021). All these essential requirements are laying over SMEs and need to be solved for the business welfare as its well known that digital transformation supports business growth (Kerry *et al.*, 2016).

1.2 Gaps in the literature

1.2.1 The organisational digital transformation culture in the Irish context

The organisational culture can underpin the process of digital transformation (Tuukkanen, Wolgsjo, and Rusu, 2022). And in a process of new technology adoption, the organisation's values and culture must be reset in line with the digital strategy adopted by the company (Ng, 2021) & (Rueckel *et al.*, 2020). However, there is a scarcity of literature based on organisational values and digital transformation in Irish SMEs, and the acknowledgment of the current organisational values and culture are enough to embrace digital transformation. This shortcoming is vital because it gives insight into the company's leadership if its organisational culture is a challenge that needs to be overcome.

1.2.2 The limited information on the challenges faced by Irish SMEs in digital transformation into the different company layers

There are many papers based on digital or technological difficulties in SMEs from many countries (Barreto and Leomar, 2021) & (Malesev and Cherry, 2021). In the particular case of Ireland, the

author came across a scarcity of information on digital transformation challenges faced by Irish SMEs, some secondary data was found (Eurostat, 2021) & (OECD. Stat, 2022) & (CSO, 2017) & (CSO, 2019) that assisted to develop a blurred idea of the difficulties in some scattered elements of digital transformation. The missing link between the scattered problematic element and the company layer to which belong are identified in this study through the application of the digital transformation enabling framework (Rueckel *et al.*, 2020).

1.3 Academic justification

Many companies are conducting extensive transformation initiatives as digital technologies significantly transform businesses. However, the success rate still is low according to a McKinsey&Company survey in 2018 the success rate was 16 percent and an extra 7 percent of respondents claim that performance improved but that the changes were short-lived. Additionally, Boston Consulting Group reported 30 percent in 2020. Ng, a chief operating officer, claims that the lack of a strategic plan, a heavy emphasis on technology, and little attention to people and processes, results in a lack of skills and procedural elements, the unbalance of culture and change, and poor communication among business units are the causes of failure (2021). Therefore if the different difficulties in an organization are not well understood, identified, or managed in line with the digital transformation among the different companies layers such as Normative, Strategic, Tactical, and Operational allowing make the link between the organisational categories and its factors (Rueckel *et al.*, 2020) then the success rate will continue to be low and the bad experiences trying to reach digital transformation objectives may affect the disposition of people involved in the process especially in small enterprises even though the rate of success here is 2.7 percent more than large companies (McKinsey, 2018).

Digital transformation is not only investing in technology but also investing in people and its organisational culture preparing for the good adoption of change while the Irish company face the different digital elements to improve in a organised manner and with the right people in charge.

1.4 Research Aim

Accordingly, with the literature gaps discussed previously and in an attempt to bridge them the aim of this study is to examine the four organizational categories in the Irish small and medium enterprise (SMEs) and determine through the nine Rueckel *et al.* (2020) facilitator factors the challenges that the firms are confronting in the digital transformation path and identify how many

digital transformation values are present in the current company culture under scrutiny and by addressing the following research questions, this study aim will be accomplished.

1.5 Research questions

To explore the areas identified as a gap in the literature and presented in section 1.2, the following research questions are postulated under the thematic of digital transformation in Irish small and medium enterprises located in the Republic of Ireland (ROI).

1.5.1 What organisational values underpin a digital transformation in ROI from the perspective of organisational culture that is forward-thinking and collaboration after pandemic?

1.5.2 How the management capabilities in digital transformation are developed in ROI under the review of strategy integration and digital leadership after Covid19?

1.5.3 How the organisational structure is managed in digital transformation into the categories of digital platforms infrastructure and processes of institutionalized innovation in ROI after pandemic?

1.5.4 What workforce capabilities in digital transformation are encouraging in ROI under the factors of creativity, innovation capabilities, and information and communication technology after Covid19?

1.6 Method and Scope

Digital transformation according to Vial (2019) is defined as a process that focuses on improving an entity by inducing major changes in its properties using information, computing, communication, and connectivity technologies. This evolution should be supported at the corporate level by shifts in culture, leadership, capabilities, and procedures, but also at the government level by actions involving numerous aspects, ranging from the development of digital competencies in the workforce to the formulation and implementation of innovative solutions (IEB, 2019). However, these major changes bring numerous challenges to the companies that must be overcome to achieve success. Notwithstanding the importance of SMEs in the Irish economy, a scarcity of information about the difficulties that these companies confront in digital

transformation in ROI have being found as mentioned in previously discussed gaps. Given the explorative research questions in section 1.5, this study was developed as a mono-method qualitative approach and the instrument was semi-structured interview in an attempt to explore this low-covered field. This study is limited to the company level and every factor or challenge that includes the government level is excluded. Further detail on the research methods can be found in chapter 3.

The primary research sample are employees from Irish SMEs because they are building culture and experimenting on a daily basis with the difficulties or benefits of working in their companies' environments as well as witnesses of digital transformation management capabilities through seven semi-structured interviews the author explores the situation in digital transformation for each company in order to satisfy the research questions discussed previously.

The small sample has allowed identifying some key challenges in the companies under scrutiny.

1.7 Dissertation Structure

Chapter 1 Introduction

This research project starts with a brief introduction to the selected study topic, followed by the identification of gaps in the literature on digital transformation and supporting justification for the study. Then specifically the study's overall goal and research questions and also the methodology approach is introduced.

Chapter 2 Literature Review

The chapter contains a variety of considerations from academic literature on the chosen topic and many examples of SMEs findings from different countries as well as key information in organisation culture relevant to the thematic discussed.

Chapter 3 Research design, process, and methodology

This chapter presents the research objectives and a detailed explanation of the chosen research methodology approach and data collection, an explanation of the sample as well as ethical considerations and limitations of the study.

Chapter 4 Research findings and discussions

Chapter 4 reports on the results of the primary data collection and the analysis of the data based on the Rueckel *et al.* (2020) framework to consider the elements as a challenge or not. As well the discussion involved secondary research consulting and was presented in the literature review.

Chapter 5 Conclusion and recommendations

This chapter presents the author's conclusions from the data gathered, the list of challenges found, and the recommendations for professional and further research.

CHAPTER 2 LITERATURE REVIEW

2.1 Introduction to literature review

This literature review is divided into nine sections distributed as follows: the first four areas are related to digital transformation concepts, theories, and vital factors including the failures in the implementation process. The following three categories discuss about the digital transformation conditions in small and medium enterprises in a global overview and Irish context versus disruptive forces. The final two sections introduce the need for transformation and key areas within the organisation.

2.2 Digitalisation

The digital revolution is a crucial disruptive force that has transformed the world and the manner in which to do core business processes and functions because of the fourth industrial revolution and the creation of the web (Parida, 2018). Nowadays, day to day business processes demand different technologies and a bunch of digital skills. A prime example would be the many corporations that have subsidiaries around the world and their necessity to share data.

Digitalisation entails being capable of integrating solutions to manage, organize, regulate, and create benefits from digital data for business growth, sustainability, and the creation of new opportunities for business and society (Parida, 2018). According to Neubert, it is advantageous for lean global start-ups to use digitalised technologies to gather and evaluate information about global markets and customers' opinions with the aim to speed the process of decision-making (2018). Despite the businesses' need to overcome the different challenges that may emerge in the implementation path, the digital transformation in the firms not only may bring colossal benefits but also the necessity to constantly update the appropriate knowledge and business strategies to manage successful business growth.

2.3 Digital transformation theories

There is an ongoing debate to conceptualize digital transformation because of the multidisciplinary viewpoints on digital transformation (Verhoef *et al.*, 2021) and the lack of understanding of how digitisation and digitalisation are shaping and transforming various industry segments (Nwaiwu, 2018). An outcome from recent research suggests that beyond traditional digitisation efforts, digital transformation is a comprehensive effort to revise core government processes and services, it progresses along a continuum from analog to digital to a full stack review of policies, current processes, and user needs, resulting in a complete revision of existing digital services and the creation of new ones (Mergel, Edelman, and Haug, 2019). The research explains the outcome of digital transformation efforts to focus on, among other things, user satisfaction, new forms of service delivery, and user base expansion (Mergel *et al.*, 2019). This concept covers a wide field given a wider understanding of the different areas related to digital transformation, but it is government institutions centered, and for the purpose of this study it is necessary for a non-institutions centric meaning such as the digital transformation concept proposed by Vial.

Digital transformation is a process that focuses on improving an entity by inducing major changes in its properties using information, computing, communication, and connectivity technologies (Vial, 2019). This actual research is going to adopt Vial's conceptual definition because it is flexible enough to adapt it to different businesses or industries and apply as an outcome boost for the companies. It is noticeable that many large businesses have done the swap from a traditional business model into a model that combines digital tendencies such as DHL or the automotive industry.

Nowadays, these companies may have better productivity and efficiency than before to embrace digital transformation. Despite understanding that digital transformation helps companies to improve their businesses, especially in tough times when an external force hit the business environment or continued growth in a global market which might have better opportunities for the firm, many companies do not report any change in the digital arena. A survey conducted by McKinsey & Company (2021) reports that only 65 percent of the businesses increase their budgets in digital initiatives.

2.4 Factors to embrace digital transformation

It is known that there is a bunch of external factors which would be categorised as driving factor because of the benefits and opportunities expected by the companies but at the same time might have sticking points in the process to adopt digital transformation within the organization and probably delay the outcome expected by the institutions and in between both scenarios are the facilitating factors. A study developed by Nwaiwu (2018) found that frameworks with scholarly founding that look at technology adoption from a 'person' perspective appear to lack the complexity essential to understanding how digitisation and digitalisation shape and transform different industry segments. This shortcoming is significant because digital business transformation is much more concerned with organisational strategy than with technology adoption and usage behavior (Nwaiwu, 2018).

In addition, other factors that impact digital transformation are digital transformational leadership and organizational agility (AlNuaimi, Kumar, Ren, Budhwar, and Vorobyev, 2022). Consequently, digital transformational leadership may compel the organisation to perform the process, keep the institution updated on digital transformation's systems, or in the worst case scenario give up in the middle of the process because of a lack of understanding. Despite the digital transformational leadership effort to achieve digital transformation, the path of change is going to vary according to organizational agility. To facilitate digital transformation, it needs a blend of factors that represent all the distinct categories of an institution because the impact of digital transformation is spread in all organisational levels, organisational structures, and organisational culture (Vial, 2019). Furthermore, there is a managerial interaction within the organisation between those groupings as follow: Normative (Organizational values), Strategic (Management capabilities), Tactical (Organizational infrastructure), and, Operational (workforce capabilities) (Rueckel *et al.*, 2020). Each of one interaction was linked to a list of factors that helps to embrace digital transformation within the organization in total are nine which are:

- Organizational culture that is forward-thinking
- Collaboration both internally and externally
- Strategic integration
- Digital leadership
- Infrastructures for digital platforms
- Bimodal IT structures
- Processes of institutionalized innovation

- Individual abilities for creativity and innovation
- Information and communications technology literacy (ICT literacy) (Rueckel *et al.*, 2020)

This study is going to adopt Rueckel *et al.* (2020) research as a guideline to follow regarding the enabling factors to adopt digital transformation because it is representing a sounding organisation stratification in a process to embrace digital transformation and succeed in the implementation because the approach sheds new light on the conditions that institutions must create. Furthermore, the study's groups and subgroups tend to facilitate future research within the context, and it is helpful to determine difficulties in the implementation process or levels of digital transformation in the organisations under scrutiny according to the pillars or elements described in the framework. The aim of this study is to examine the four organisational categories in the Irish small and medium enterprises (SMEs) and determine through the nine factors the challenges that the firms are confronting in the digital transformation path.

2.5 Why the adoption process of digital transformation fails

A study conducted in Swedish SMEs by various researchers found that many cultural values stratified into three categories such as continuous improvement, transparency, and cooperation are crucial in digital transformation (Tuukkanen, Wolgsjo, and Rusu, 2022). These values are rapid responses to changing environmental conditions, strive for organizational growth, attachment to the organization, ongoing education, tolerance for mistakes, an openness to calculated risks, confidence between the company and its client, and internal organization trust (Tuukkanen *et al.*, 2022). A lack of these values within the organization which is striving to implant digital transformation may spoil the process or do more harm for the entire organization. A global digital survey was done by the Boston consulting group revealing that only 30 percent of companies achieve their goals in digital transformation (2020). This low percentage of success is shocking and according to Ng a chief operating officer, the failure comes from an absence of a strategic plan, a major focus on technology, and low interest in people and processes therefore lack of skills and procedural elements in place, the misalignment of culture and change, a miscommunication among business units (2021).

Analysing these researches shows it is noticeable that adopting digital transformation is a process in which people are the most important asset instead of just putting in place technological systems. The digital transformation leadership plays a crucial role in implanting the change in the institution because the leader must pull both sides of implementation people and technology at the same time. He or she needs to create a culture of change in the firm and enforce collaboration, communication, skilled employees, planning the change, and procedures or guidelines to achieve the digital transformation objectives. Another research demonstrates that the difficulties more recurrent in

digital transformation within the organization are the necessity of new knowledge to upgrade digital skills, misunderstanding, and mistrust in digital transformation, regulatory limitations, and the scarcity of digital abilities and expertise (Kutnjak, 2021). Digital transformation rely more on people than physical or technological assets of course but these resources are needed in the process to become digital, but people are the key to the success of transformation. If it is just technological change that takes place within the firm and no action taken with regards the people, then digital transformation is going to fail. All these different points lead to the idea that digital transformation is about people plus modern technology adoption therefore people must be prepared for the adoption of new technologies if the company wants to succeed in the acceptance of digital transformation.

2.6 Small and medium enterprise a global overview versus disruptive forces

The business background suggests that the pandemic affected the entire world economy pushing firms to adopt digital trends (Baig, Hall, Jenkins, Lamarre, and McCarthy, 2020). As a response to many social distance regulations. A large number of firms were under threat and just a small number of companies took new business opportunities (Stephan, Zbierowski, Perez-Luno, and Klausen, 2021). Small and medium enterprises (SMEs) are much more susceptible to business disruption activities than global or large corporations because of the lower resource levels and productivity (OECD, 2020). In addition, the OECD reveals that between 25 percent to 36 percent of the firms faced a shutdown permanently (2020). To embrace digital transformation, it is necessary that firms invest not only in creating digital business pages and posting them on social media to reach customers but also there is the internal necessity in the business to adapt their business model and culture as discussed in previous stages in this current research.

During the pandemic, 70 percent of SMEs worldwide increase the use of digital technologies within the business (OECD, 2021) and 72 percent of Canadian SMEs think that e-commerce is necessary (PayPal, 2020) while 55 percent of Brazilian SMEs increased their customers' service because of digital technology (ZDnet, 2020). A difficulty discussed by Barreto and Leomar (2021) was that the big problem for SMEs is access to the capital to invest in IT and be able to follow the digital trend. These barriers stop the SMEs from their growth and an innovative manner to create value.

The United State Census Bureau reported that 65 percent of the SMEs were negatively affected (2022). Some governments included in their police response attempting to assist their SMEs not only with fiscal or financial programs to support the losses through the pandemic peak period but also projects oriented to increase digital transformation into the firms, countries as Chile, China, France while

others countries just facilitated loans under the category of new business opportunities such as Estonia among others (OECD, 2020). Both assisting positionings are helping the ongoing of the SMEs until today but the smartest one is without hesitation the government assisting in the adoption of digitalization into the businesses because this action is going to provide direction to firms into the new era and possibly these companies might have better opportunities in a long-lasting digital transformation. Therefore, in e-markets, globalization and responding better to a new market disruption in the future because the lack of knowledge to understand the new digital channels for value creation and the new customers' demands is not an easy task for SMEs by themselves, on the other hand, it is not easy to obtain a great value from digital technologies if the sets of skills are not updated (Barreto and Leomar, 2021).

Another study was done in Australia, and some of the findings of using digital channels suggest that SMEs face many organizational challenges (Malesev and Cherry, 2021). These two forces, Covid-19 and digital trend might have put under pressure many companies and the literature review suggest that SMEs in different countries faced different barriers regarding digitalization. Despite the importance of Irish SMEs in the economy, there is a lack of studies on this topic. At this time, it is worth exploring this level of digital adoption in the Irish SMEs and understanding their actual situation and the challenges that they are facing to be aware of what they need and start taking action to overcome the issues and embrace successfully the digital transformation.

Research done on SMEs in Austria concludes that IT adoption, employee skills, and a digital strategy all contribute significantly to digitalization, which in turn drives SME financial performance (Eller, Alford, Kallmunzer and Peters, 2020). In addition, the study reveals that a digital strategy is needed and performance indicators to measure the transformation process (Eller *et al.*, 2020). Digitalization opens the door to internationalization, increases the local market share, and facilitates agreements with suppliers, financial tasks, marketing, and customer service. It makes the administration of the firm easier and supports competitiveness. A finding explains that there is a positive correlation between portal functions (including portal maintenance service) and perceived organizational performance and contributes to increased efficiency and effectiveness because of cost savings. (Kerri, Jaw, and Wu, 2016) while Malesev and Cherry (2021) found many challenges managing digital channels, these difficulties are trying to establish a functional social platform or website in the long term, give maintenance to the platform, difficulties for SMEs owners in their mid-40 to manage digital and marketing tools. As discussed before putting in place technology does not mean that the company achieves digital transformation because it can work for a while, then systems may need maintenance whether employees have no information about what must be done to the modern technology so it cannot continue working and the digitalization process would be at risk.

2.7 Irish SMEs' digital condition before Covid-19

The Irish SMEs are fragmented as Services 54 percent, Construction 20 percent, Distribution 17 percent, Industry 6 percent, and Financial & Insurance 3 percent (CSO, 2017). This current project will concentrate on distribution and Industry. Ireland ranked sixth place in the Digital Economic and Society Index in the 2018 report (DESI) (European Commission, 2018) by contrast, the EU's Digital Intensity Index (DII) (2020) reveals a large majority of Irish enterprises with at least ten people employed have little knowledge of digital technologies (Eurostat, 2021). As it is well known, Ireland is a host of multinational companies such as Facebook, Google, PayPal, and Microsoft among other companies with prominent levels of digital transformation, and at the same time local companies (SMEs) which have little or no technology in their business model or processes. A report from the OECD (2019) revealed some of the situations of many SMEs as follows

- Poor managerial skills in comparison to high-income countries (UK, Germany, Sweden).
- Overall, advancement in the digitalization of business processes is encouraging. For example, in 2015, Ireland ranked 22nd out of thirty primarily OECD countries in terms of ERP use, and in 2017, it had the second lowest density of industrial robots in the EU-15.
- A digital skills gap in comparison to the EU average.
- Management training is provided to a small number of SMEs.
- Low participation in international markets (not including the UK).
- Low productivity in contrast to the foreign SMEs settling in Ireland especially among the small and medium-sized.
- Low levels of R&D.
- Low investment in physical assets (Lawless, O'Toole, and Slaymaker, 2018).
- SME managers are unaware of the opportunities and benefits of digitalization (EIB, 2019).

In 2017 Irish small companies were measured by the OECD. Stat in ICT as follow (Small firms are companies between 10-49 employees)

- Use of computers 55.63 percent and in 2019 just increase 2.71 percent.
- Website 70.88 percent increasing 11.49 points by 2021.
- Cloud 32.45 percent and in 2021 the companies achieve 58.79 percent.
- Use of RFID 10.94 percent and no data available for the following years.
- Use of CRM 29.25 percent and a slight increase of 2.42 percent in 2020.
- Social Media 65.25 percent and in 2021 this indicator showed a contraction of 1.52 points.

And it is shocking that the percentage of ICT training in the last twelve months was 12 percent in 2019 (OECD. Stat, 2022). According to the data and its percentages of increase over time, it is noticeable that the adoption of digital transformation is not constant it may appear that the digital transformation strategy followed is disorganised because according to Rueckel *et al* (2020) the process to embrace the digital transformation has to be through the nine factors which represent the entire organization (the four categories) instead of putting technology in place. Additionally, there is no data that compares the changes in the organizational culture as a precedent of development in digital transformation adoption. Digital transformation is a matter of people using technology, following guidelines or processes, collaborating with each other to solve problems, and sharing information or knowledge with people adopting the digital transformation change. It is clear from the literature why the adoption of digital transformation fails because people resist the change, or they do not have a deep understanding of digital transformation and its implications and because people's misunderstanding of the leader's role in digital transformation plays vital support in the transition process and is part of the nine factors to enable digital transformation.

2.8 Irish (UK or USA) SMEs Covid-19 impact overview and its implications in digital transformation

The Irish SMEs account for 43.6 percent of turnover and almost 40 percent of gross value added and also provide 66.4 percent of the employment in the country employing over 1.5 million people (CSO, 2019). The pandemic's impact resulted in 36 percent of firms losing money in 2020, and the share of firms making a profit fell to just under one-third (O'Toole, McCann, Lawless, Kren, and McQuinn, 2021). Despite large reductions in turnover, a small percentage of firms continued to make profits, implying high-value creation in these few cases (O'Toole *et al.*, 2021). From these statistics, it can be suggested that there was a tremendous impact on SMEs and the unknown future has more than likely caused stress on people in all sectors because of the economic breakdowns and the challenge to continue creating profit. In addition, the digital trend of the market arose in sectors available to provide products or services through web pages, social media, phones, and others (Baig *et al.*, 2020) but in the particular case of Irish SMEs before the pandemic, the adoption of digital transformation was relatively low also its percentage of share in international markets even though the large list of projects developed with the aim to assist the SMEs (OECD, 2019). The SMEs may have struggled between these two disruptive forces: the pandemic and digital trend.

During the first wave of infection, SMEs were seriously damaged on value-added which in 2020 Q1 and Q2 was -33 percent in wholesales category (McQuinn, O'Toole, Allen-Coghlan, and Coffey, 2020).

During the distinct stages of lockdown, the need for digital transformation within the businesses was strong in order to follow the restriction of social distance. However, there is not much information related to digitalization in the Irish SMEs and how the sector faced this necessity despite the importance of SMEs in the Irish economy. A general Irish indicator of managing basic digital skill rank at 53 percent (European Commission, 2019). And the World Economic Forum (2020) reported almost 60 percent achieved in skills needed for jobs and Market of Tomorrow in Ireland. However, digital transformation is more than managing a bunch of new skills. Digital transformation is related to organizational culture, strategy, leadership, structures, and more with the aim to promote broad-based growth.

Even when the Irish SMEs had a strong financial position before the pandemic (McQuinn and McCann, 2017), it is not known how much the SMEs were digitally prepared to continue creating value in a situation of social disruption. Additionally, the OECD (2019) reported that over the last ten years Irish firms have had a lack of performance in comparison with foreign companies and the disparity is expanding despite The National Skilled Strategy Program launched by the government trying to overcome the situation, the Irish firms have a low acceptance rate to introduce changes, therefore, its employees would not be able to use these new sets of skills among the ICT literacy. The SMEs' resilience not only lies on their financial position but also on the adoption of digital practices that are needed in a world during and after the pandemic.

It is important to explore the strengths or weaknesses that might have the Irish SMEs related to the digital trend and unravel their digital challenges and understand what problems are deterring them from adopting changes. This new digital imposed trend during the pandemic may have pushed some of the SMEs to learn and engage in the new reality but what were the challenges that the firms faced. A survey done in the UK reveals that 60 percent of UK SMEs adopted digital technologies and 38 percent updated their digital skill capabilities, one-fifth were thinking to impose new management practices and almost 40 percent had made changes to workplace organization (Riom and Valero, 2020). The responses from the businesses under the survey demonstrate that they would have no idea how to properly embrace digital transformation in order to be successful in the process, as only one-third of those who have implemented digital technologies plan to implement digital transformation management practices contrasting with the findings and suggests from many authors in the literature review (Tuukkanen et al, 2022), (Kutnjak, 2021), (Vial, 2019), (Tuukkanen, *et al*, 2022) and in line with Boston Consulting Group's (2020) statistics, which show that only 30 percent of companies that began a digital transformation process achieve that goal and supporting the organizational change bound in digital transformation research conclude that digital transformation

is best described as constant evolution that can be provoked and formed by episodic bursts, with the latter inducing additional continuous change (Hanelt, Bohnsack, Marz and Antunes, 2020).

Digital transformation appears to be an integral process that embraces technology, people, digital skills, leadership, and organizational change in culture and business models, and by pulling all these areas together success can be achieved. In addition, the digital transformation after the pandemic became urgent for business and society (European Commission, 2021) even though, many steps to digital transformation were done before, there is tons of work to be done in this stream (Schwab, Zahidi, 2020) & (European Commission, 2021) & (Eurostat, 2021) & (Kutnjak, 2021).

2.9 The need of post covid19 transformation

There is a communication from The Commission to the European Parliament that has a vital message to the EU countries aimed at a digital decade by 2030 and its ambitious vision is to build a digital society in which no one, neither people nor businesses, falls behind (European Commission, 2021). This document discusses key areas to work with as digital expertise, digital facilities, digitalization of businesses (including SMEs), government services, and a wide digital society interaction thus this current period of time is pivotal for SMEs developing digital transformation leadership, a culture that supports digital transformation process, ITC literacy, a digital strategy, and the digital infrastructure. Mckinsey survey (2021) suggests digital transformation momentum across companies after covid19 because of the changes in customers behavior using technology to order products or services so this new life post covid appears to demand more digital products and probable companies that are not able to cope with this trend now might compromise their survival in the future.

Digital Transformation supports business growth (Kerry *et al.*, 2016) thus digital transformation brings benefits to the businesses and might promote the firm's internationalization process also there is a digital transformation agenda from The World Economic Forum for the next five years which is proposes an upgrade labour force, transform markets, environments and innovations systems to support global competitiveness after the pandemic and reach the markets of tomorrow (Schwab, Zahidi, 2020). It is noticeable that post covid19, the economy is going to rely more on digital transactions and companies that cannot overcome the digital transformation challenges might experiment a fall in their turnover and perhaps these firms would be forced to shut down the business. Digital transformation process demand to be implemented in an adequate manner to overcome any digital transformation obstacle and be successful in reaching the digital age and open the firm's door to the entire world.

2.10 Key areas and factors of transformation

There are a variety of factors out of the scope of this current work such as at the government level ranging from the development of digital qualifications in the labour pool to guaranteeing a stable environment for the creation and implementation of innovative solutions. Additionally, to provide and explain the benefits of digital transformation to SMEs managers in order to change the belief that it is a cost effective factor to a new opportunity and it needs more financing support, because the cost of digital transformation funds is the second highest in EU (EIB, 2019) all these factors mentioned before could be developed in further investigations. The vital areas that are going to be addressed are related to the company scope only.

Digital transformation necessitates a corporate shift related to digital technologies, as well as the incorporation of transformation processes through every aspect of the business. This transition should be assisted at the business level by changes in culture, leadership, skills, and processes (EIB, 2019). All these areas of transformation may foster greater co-operation and communication within the company, resulting in a business that is constantly improving and encouraging more competitive products to customers. Research done on the difficulties faced by firms in digital transformation found many problems such as the adaptation or adoption of a new business model, innovation, new processes or services, the change of internal systems, new ways to work, lack of comprehension or knowledge, mistrust in modernisation, lack of comprehension of the need to expand the number of IT experts, and unknown benefits from the implementation of digital transformation, standards deficiency, poor strategic vision of top management, ambiguous strategy, low level of awareness in digital transformation, leadership with no vision of digital transformation among others (Kutnjak, 2021). All of these difficulties fit into one of the factors of transformation described by Rueckel *et al.* (2020) and the research offers a consistent overview of key determinants for commencing digital transformation initiatives and can prepare the organizations for their digital transformation path as mentioned before this Rueckel *et al.* framework (2020) is going to be a guideline to follow in the investigation of the key challenges faced by Irish SMEs, particularly in the category of distribution (retail trade) and industry (manufacturing) (according to the categorization of CSO).

The first factor according to Rueckel *et al.* (2020) is an organizational culture that is innovative, and an innovative company inculcates in its employees' organizational values such as adaptability, agility, and tolerance for failure, as well as a desire to learn, involvement, confidence, risk affinity, entrepreneurship, innovation, teamwork, connectivity, and customer orientation. All these values are important in the adoption process of a continuous improvement culture, especially in the stream of digital transformation. The second factor is related to cooperation both internally and externally and

is defined as a belief structure within a company that encourages collaboration among its employees, regardless of their specific roles or departments, as well as the inclusion of third parties in all stages of an innovation process (Rueckel *et al.*, 2020). The application of this factor might solve some of the difficulties presented before and might ease the manner in which to address the process of innovation because they are encouraging constructive knowledge among company stakeholders.

The Rueckel *et al.* (2020) third factor is strategic integration which is defined as a set of co-operative strategic planning processes that result in an interwoven digital business strategy while also controlling the necessary organizational transformational processes. This third factor contributes to the pulling together as a company. The entire teamwork transformation process creates positive synergies among the team players. The fourth is the digital leadership factor and it is understood as a management board that considers digital technology as an investment, acknowledges its strategic or comeback orientation, and includes a member who serves as an IT controller and is bound to the bimodal IT factor that supports the IT role in continuous improvement for the existing organizational model followed by the factor of digital platform infrastructures which is defined as an interconnected IT and/or Integrated System facilities, this factor enables the efficient and effectiveness of core organizational operations via digital transformation (Rueckel *et al.*, 2020).

Another vital factor is the institutionalized innovation process thus defined as a set of systematic processes aligned within the organizations' setting to enforce structural value and acceptance of the change binds it with the individual creativity and innovation capabilities factor to embrace the organization and its people (Rueckel *et al.*, 2020). The final factor described is ICT literacy and to clarify the meaning they defined it based on the ICT literacy panel report which states that ICT literacy is the ability to access, manage, integrate, evaluate, and create information using digital technology, communications tools, and/or networks in order to function in a knowledge society (Educational Testing Service, 2007).

2.11 Literature review conclusion

Nowadays digital transformation is a vital driving force to achieving company growth in a competitive environment and provides many advantages to companies that make changes in their organizational environment. However, this trend brings many difficulties that need to be overcome on time to avoid the digital transformation process failure. Digital Transformation implies significant changes through the use of information, computing, communication, and connectivity technologies (Vial, 2019) with the goal of improving the business and it is a valuable strength in disrupting times. However, there is

a large number of companies that are not aware of this importance or are unable to implement it successfully (Mckinsey & Company, 2021), (BCG, 2020) & (Tuukkanen *et al*, 2022), (Kutnjak, 2021), (Barreto and Leomar, 2021), (Malesev and Cherry, 2021), among others researchers cited in the literature review. To achieve success in the implementation process it is needed to follow an integrated framework that enables the various levels of the organizational structure and culture (Vial, 2019) which is analysed by Rueckel *et al.* (2020) in terms of digital transformation factors to enable the digital transformation process. The Adoption of digital transformation fails many times because there is little importance put on people, organization culture, strategic plan, procedures, and lack of knowledge and communications (Ng, 2021). People play a significant role in this process especially the digital leader because he must initiate the culture of change to embrace digital transformation within the company. Digital transformation is not only the installation of modern technology but also, the cultural organization and business model changes within the firm. The SMEs are threatened in their long term digital transformation process because of the emerging difficulties during the process and the lack of understanding of digital transformation and benefits (Malesev and Cherry, 2021) and in the particular case of Irish SMEs there is a scarcity of digital technologies (Eurostat, 2021) and poor managerial skills, low productivity and digital skills gap (OECD, 2019) and there is no data to compare the changes in the organizational culture as a precedent of development in digital transformation adoption. It is important to explore the strengths or weaknesses that might have the Irish SMEs related to the digital trend and unravel their digital challenges and understand what problems are deterring them from adopting changes. Digital transformation is an integral process that embraces technology, people, digital skills, leadership, and organizational change in culture and business models, and by pulling all these areas together success can be achieved. This need for transformation lays on the objective of The Commission to the European Parliament (2021), in the change of customer behavior after covid (Mckinsey, 2021), in the benefit from digital transformation (Kerry *et al.*, 2016), and in the strategy of global competitiveness after pandemic (Schwab and Zahidi, 2020).

This research has been influenced by Rueckel *et al.* (2020) who developed a framework to enable the digital transformation inside the companies, (Malesev and Cherry, 2021) who explore marketing through digital channels, and (Tuukkanen *et al*, 2022) who investigate about cultural values in digital transformations. As a result, decisions made in the instrumentations and methodology sections were conducted as described in the next chapter.

CHAPTER 3 RESEARCH DESIGN, PROCESS, AND METHODOLOGY

3.1 Introduction

According to Quinlan, Babin, Carr, Griffin, and Zikmund (2019), the research methodology is an overview of how the research is conducted and what assumptions underlie it. Saunders, Lewis, and Thornhill (2019), describe it as an explanation of the development of knowledge based on beliefs and assumptions and the research design as the overall strategy for answering the research question. This strategy includes research objectives, the target where the data is going to come from, and how the data is going to be managed and analysed (Saunders *et al.*, 2019).

3.2 Research aim and objectives

A research aim is a concise explanation of the research project's proposal, and the research objectives lead to massive specificity of the research question (Saunders *et al.*, 2019). The aim of this research is to reveal the challenges faced by the Irish SMEs in the retail trade and manufacturing sector in digital transformation post covid19. This challenge is going to be at the company level and exclude the challenges at the government level. To achieve this goal, the following objectives have been established.

Research objectives:

1. To investigate the role of organizations values in digital transformation in ROI, post covid, under the review of organizational culture that is forward-thinking and collaboration.
2. To explore the role of management capabilities in digital transformation in ROI, post covid, through strategy integrations and digital leadership.
3. To examine the role of organizational structure in digital transformation in ROI, post covid, through digital platform infrastructure and processes of institutionalized innovation.
4. To inspect the workforce capabilities in digital transformation in ROI, post covid, under the factors of creativity, innovation capabilities and information and communication technology.

3.3 Proposed research methodology

It is fundamental to this study to reveal the different digital transformation difficulties that many Irish SMEs are facing through an exploratory method. It is vital to the research debate on organizational values, management capabilities, organizational infrastructure, and workforce capabilities which are

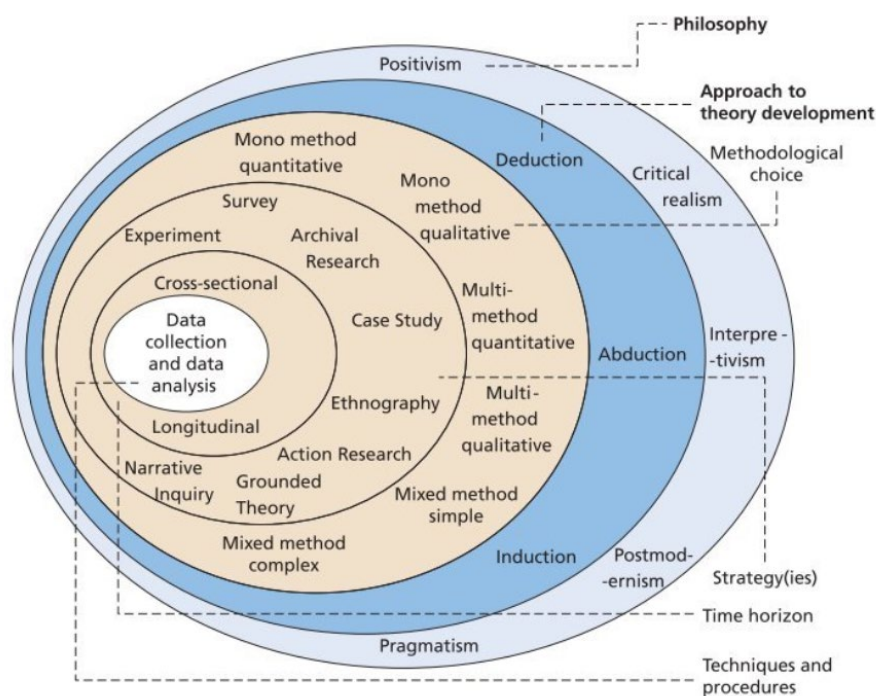
bound to nine factors to enable digital transformation discussed before. During the research process, the researcher's goal was to remain open to interpretation. The chapter presents the different methodologies and techniques considered for this study, as well as the abrogation of one comparative to another.

In this study, the author chose qualitative methodology based on the Saunders Onion (figure 1) which is the diagram used to illustrate the issues that underpin the selection of data collection techniques and statistical treatment (Saunders *et al.*, 2019).

Saunders *et al.*, (2019) advise that during the research process the importance of understanding each layer of the onion to provide a sound methodological process. The methodological process consists of unwrapped layer by layer in which decisions must be made before arriving at the final methodology approach to the research and data collection process.

The center of the onion is represented by gathering and interpreting the data and the inner layers highlight the importance of considering methodological approach, strategies, and techniques. It contrasts with the outer layer, which is more concerned with philosophies and possible approaches to theoretical development and serves as the preliminary step for this study's interpretation of methodology and methods to use. The following sections are going to discuss the Saunders Onion showing the choices for philosophy, theory development, methodological strategy, techniques, and procedures (Saunders *et al.*, 2019).

Figure 1: Saunders research onion (Saunders et al., 2019)



3.4 Research Philosophy

This section is going to outline the philosophy that the researcher chooses and justify it in relation to the others.

3.4.1 Ontology, Epistemology, and Axiology theories

According to Saunders *et al.* (2019), Ontology is a belief about the nature of reality. The ontological assumption from the researcher in this study was that the mixture of factors to implement digital transformation in Irish SMEs are different from the rest of European Countries or the UK and US therefore the challenges may vary in comparison. Epistemology refers to understanding inferences, what constitutes appropriate, valid, and genuine knowledge, and how we can spread the information to others (Burrell and Morgan, 2016). Regarding to this research the epistemology assumptions were the narrative employee experiences in digital transformation from the Irish SMEs and this is the most important because the nature of this research is explorative, and the findings would be compared with the findings from other countries studies. And finally, the role of values and ethics is alluded to as axiology (Saunders *et al.*, 2019). The values from the research and the viewpoint from the respondents in the research were under this category. However, the main theory who represent the aim and objectives in this research and with the data is the epistemology theory. The other two theories have a minor level of importance in comparison with the epistemology philosophy.

Table 1: Philosophical assumptions as multidimensional set of continua (Saunders et al., 2019)

Assumption type	Questions	Continua with two sets of extremes	
		Objectivism	Subjectivism
Ontology	• What is the nature of reality?	Real	↔ Nominal/decided by convention
	• What is the world like?	External	↔ Socially constructed
	• For example:	One true reality (universalism)	↔ Multiple realities (relativism)
	– What are organisations like?	Granular (things)	↔ Flowing (processes)
	– What is it like being in organisations?	Order	↔ Chaos
	– What is it like being a manager or being managed?		
Epistemology	• How can we know what we know?	Adopt assumptions of the natural scientist	↔ Adopt the assumptions of the arts and humanities
	• What is considered acceptable knowledge?	Facts	↔ Opinions
	• What constitutes good-quality data?	Numbers	↔ Written, spoken and visual accounts
		Observable phenomena	↔ Attributed meanings
	• What kinds of contribution to knowledge can be made?	Law-like generalisations	↔ Individuals and contexts, specifics
Axiology	• What is the role of values in research? Should we try to be morally-neutral when we do research, or should we let our values shape research?	Value-free	↔ Value-bound
	• How should we deal with the values of research participants?	Detachment	↔ Integral and reflexive

Table 1 shows the contrast between objectivism versus subjectivism and the best quality of data for this research is related to the individual context, opinions, assumptions, and meanings in order to share knowledge into the context of difficulties in digital transformation in Ireland while in contrast with the numbers and observable phenomena is not deep enough to understand the experiences from people or the different view of organisational realities. As a result, the author choice is the philosophy of epistemology with a subjectivism orientation.

3.4.2 Positivism, Realism, interpretivism, postmodernism, and pragmatism

Saunders *et al.* (2019) made the comparison between these five management theories with the three research assumptions in table 2

Table 2: Comparison between five management theories (Saunders et al., 2019)

Ontology (nature of reality or being)	Epistemology (what constitutes acceptable knowledge)	Axiology (role of values)	Typical methods
Positivism			
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically quantitative methods of analysis, but a range of data can be analysed
Critical realism			
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological relativism Knowledge historically situated and transient Facts are social constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency Range of methods and data types to fit subject matter
Interpretivism			
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched, subjective Researcher interpretations key to contribution Researcher reflexive	Typically inductive, Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted
Postmodernism			
Nominal Complex, rich Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	What counts as 'truth' and 'knowledge' is decided by dominant ideologies Focus on absences, silences and oppressed/repressed meanings, interpretations and voices Exposure of power relations and challenge of dominant views as contribution	Value-constituted research Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically reflexive	Typically deconstructive – reading texts and realities against themselves In-depth investigations of anomalies, silences and absences Range of data types, typically qualitative methods of analysis
Pragmatism			
Complex, rich, external "Reality" is the practical consequences of ideas Flux of processes, experiences and practices	Practical meaning of knowledge in specific contexts 'True' theories and knowledge are those that enable successful action Focus on problems, practices and relevance Problem solving and informed future practice as contribution	Value-driven research Research initiated and sustained by researcher's doubts and beliefs Researcher reflexive	Following research problem and research question Range of methods: mixed, multiple, qualitative, quantitative, action research Emphasis on practical solutions and outcomes

For the purpose of this research which has been explorative and aimed to reveal the digital transformation challenges faced by the different firms under scrutiny, the contrasting thought of these theories was under the category of epistemology assumption. The positivism positioning is rejected because it implies measurable facts and generalizations numbers so these elements are not enough to gain a deep understanding of the different firms. Critical realism can provide an in-depth data analysis but under the assumptions of reality understanding, is the consequence of social conditioning (Saunders *et al.*, 2019) so this assumption causes the loss of the individuality of each firm under scrutiny and their individual experiences as a consequence this theory is rejected by the researcher. Postmodernism and pragmatism are rejected because this study is not interested in a dominant point of view or a problem solving of a situation instead of that is seeking perceptions and/or interpretation and experiences from the different participants so the interpretivism management philosophy in contrast with the other theories has the better association with the explorative objectives in this research.

3.5 Research Approach

3.5.1 Inductive or deductive method of developing theories

The deductive method occurs when all of the premises are true and thus the conclusion is true while in the inductive method of rationalization there is a perfectly rational gap between the final result and the premises observed, with the conclusion judged to be supported by the observation made (Ketokivi and Mantere, 2010). Saunders *et al.*, (2019) state that deduction reasoning entails the formulation of hypotheses that are rigorously tested through a sequence of prepositions and permits being to recognize and foresee the occurrence of a phenomenon, allowing it to be controlled. So according to Saunders definition of deduction reasoning is contrasting with the objectives of this study which are exploratory in nature without intentions of predicting an event and controlling it in the future. As a result, the researcher rejected the deductive approach and choose the inductive method because the researcher is concerned with the context in which the observable event occurs through the employees interviews and developing a conceptual framework. Thus, individual experiences, subjectivity, and interpretivism are vital in this research process. In these theories mentioned according to Saunders *et al.* (2019) the typical method to collect or manage the data are limited samples, a qualitative process of analysis, identifying factors, and building a conceptual framework from the phenomenon explored.

3.5.2 Descriptive or exploratory study

The descriptive research is to create a detailed profile of events, people, or situations (Saunders *et al.*, 2019). So prior to collecting the data, it is necessary to have a clear understanding of the phenomenon because throughout the study of the data collected is going to make conclusions that are going to affect the population under scrutiny in contrast with the exploratory research that uses open questions or semi structured interviews to capture the situation and generate knowledge in the arena under study (Saunders *et al.*, 2019). As mentioned before this research was exploratory in nature seeks to generate knowledge so the choice of the study was exploratory.

3.6 Research Strategy

3.6.1 Quantitative and Qualitative data

Positivism is commonly based on quantitative research design (Saunders *et al.*, 2019). Positivism, deduction, and a quantitative research design are inextricably linked (Bryman, 1998). In this data collection technique, it is necessary that the stratification of the numerical data within the sample to compare or contrast further interactions among variables and it is always associated with experimental strategies and the use of statistical methods and graphs to analyse the data and draw generalised conclusions (Saunders *et al.*, 2019) whilst an interpretive philosophy is frequently associated with qualitative research (Denzin and Lincoln, 2018). It is also called naturalistic because researchers do their studies in a natural context in order to gain a deep understanding of the scope under scrutiny. Qualitative approaches rely on words and images rather than numbers (Saunders *et al.*, 2019). Because words and pictures can have multiple meanings as well as ambiguous interpretations, it is frequently imperative to investigate and clarify these with participants so the technique to collect the data may be unstructured or semi structured and it is most likely to be used nonprobability sampling techniques (Saunders *et al.*, 2019). The qualitative research design may employ a single data collection technique, which is referred to as a mono method qualitative study; however, if the method employs more than one qualitative data collection technique, it is referred to as a multi-method qualitative study (Saunders *et al.*, 2019). From this information and the type of data that is needed for the purpose of the study and the influences from other research that have influenced this study, the researcher made the decision.

One of the previous studies that have influenced this research is the study of an updated framework of factors enabling digital transformation by Rueckel *et al.* (2020) and published by Pacific Asia Journal

of the Association for Information Systems. The Rueckel *et al.*(2020), study it is an important framework for starting digital transformation initiatives its simple system, as well as, its close links to traditional operational, tactical, strategic, and normative management aspects, can help the manager to prepare their organizations for digital transformation taking into account nine vital factors in the implementation process. The data collected in the Rueckel *et al.* (2020), study was through experts' interviews seeking to build the current framework. In this study, the author applied Rueckel *et al.* (2020), framework as a guideline in the exploration of digital transformation through the nine factors in the organizations and found the difficulties faced by employees in Irish SMEs. Another qualitative influenced study is Digital and social media marketing – growing market share for construction SMEs by Malesev and Cherry (2021), the study found a list of difficulties among them a misunderstanding among owners or managers of the firm related to digital transformation and its implications in social media and digital marketing. The researcher choice is the qualitative mono method strategy.

3.6.2 The qualitative mono method approach adopted in this research

The aim of this research is to reveal the challenges faced by the Irish retail trade and Manufacturing SMEs in digital transformation post covid19. For achieving this goal it is vital to capture the different experiences of the employees of the firms through semi structured interviews and gain an understanding of this context.

First of all, the single data collection technique involved a sample of seven semi structured interviews and each participant was interviewed for 30 minutes. Secondly, the participants chosen for this research are employees of SMEs who are coping with difficulties in the company. Finally, obtained the experiences and perspectives of digital transformation across the key questions related to the themes in the framework developed by Rueckel *et al.* (2020), and the nine factors discussed in previous stages of this research.

3.7 Qualitative data management

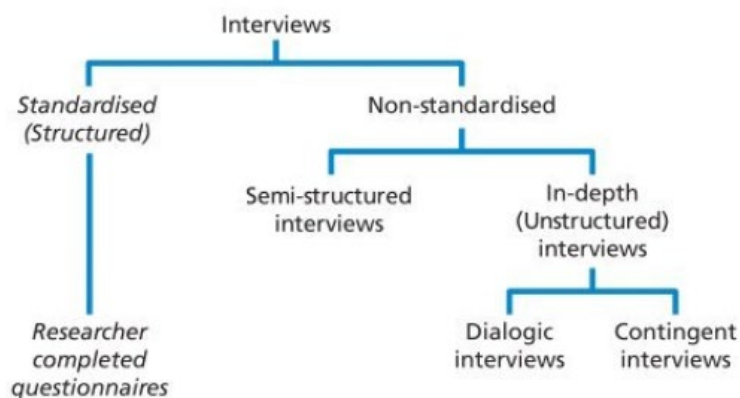
In qualitative researches the data gathered by unstructured or semi structured responses must be interpreted by the researcher. There is a process called Validation interview which is typically presented by some of the research results to some participants with the aim to confirm the level of agreement with the findings (Adams, Khan and Raeside, 2014). In conducting interviews, the researcher has to be accurate as possible in this case the sequence of questions had been the same with all the participants and adhered to similar protocols for starting and ending (Adams *et al.*, 2014).

The researcher encouraged participants to respond by emphasizing the significance of the work and their contribution to the study. In the case that the participant strayed, the researcher repeated the question as well as explanatory probes when were needed, for example, what did you mean by that?

3.7.1 Primary data collection

There are a variety of interviews as it is showing in figure 2 where the main classification is between standardised and non-standardised and the differences among them is the instrument utilised and it can be varied between standardised questionnaires and non-standardised interviews, both semi-structured and unstructured (Saunders *et al.*, 2019). For the purpose of this research, the choice is face to face semi-structured interviews with four themes based on the organizational categories and key questions related to the digital transformation enabling factors (Rueckel *et al.*, 2019). The face to face interview was chosen because of the in depth information gathered. This structure of primary data collection by interview is based on the explanation of semi structured interviews in Saunders *et al.* (2019). Additionally, the researcher is going to present an interview transcription to one interviewee and take annotation of the agreement level. The finding was presented as a report and compared with the finding in the literature review.

Figure 2: Interview structures (Saunders et al., 2019)



3.7.2 Population and Sample Population

According to the Cambridge dictionary, population is known as the totality of people living in a specific area such as a country, a county, town, city, or the totality of people living in the world (2022). However, in research methods the population is not only people but also animals, plants or things such as production, shops, cars *et al.* It is unrealistic to do research taking into account the entire

population because time consuming and research costs, so the most convenient decision is taking a sample or a subgroup of people, animals or things from the population under scrutiny.

The population group in this research are retail trade and manufacturing employees and they are appropriate because as part of the organization they are creating the culture and facing daily digital necessities in the job or any unexpected situation which they came across or in the worse scenario have no idea at all of the digital transformations. The size of the sample is seven people because the small sample size is a typical sample method in interpretivism and the method to collect the data from one-to-one semi structured interview is by audio recordings, also it is not ruled out a change in the method one to one interview to online interviews (if the participant agrees with recorded the interview, if not the questionnaire was provided by email) because fear from covid19 among the participants.

To protect personal data, each interviewee's personal information had been removed from the finding report. The researcher will refer to each as the interviewee in the findings and discussion chapter. Each of their responses or quotes will be quoted by the researcher, for example, interviewee one will be referred to as I1.

The researcher has conducted the interviews and has been in charge of all recordings, transcripts, and data collection.

3.7.3 Analysing the data

By paying close attention and actively participating in the research interview, it is possible to investigate topics of interest, clarify, and confirm meanings (Saunders *et al*, 2019). An interpretivism researcher permits research to frequently track the flow of the data collected and obviously the data presents variation among the participants because their experiences and perspectives are different and as a consequence, the analysis is in a reported manner instead of making an effort to overcome differences (Saunders *et al*, 2019). Additionally, just one participant per company was selected to avoid similar experiences and perspectives from the same environment. As a result, the analysed data came from seven different environments because the author was interested in gaining information from different companies.

The transcription was made by Teams transcript and the process of data cleaning (Saunders *et al*, 2019) was done and a copy was sent to one of the participants for approval and ensure accuracy in the data analysis process. Additionally some participants preferred to answer the questionnaires from

the semi structured interview by themselves because they were worried about disclosing any confidential information.

3.8 Ethical issues

In the context of the study, ethics refers to the principles of conduct that instruct your behaviour in order to protect the rights of those who become the subject of the study (Saunders *et al.*, 2019). This research complies with the twelve golden rules to ethical research conduct published by The European Commission (2013) and The National College of Ireland Ethics code. Additionally, an ethics form was submitted to the National College of Ireland.

3.9 Limitations to the research

This study has a list of limitations the first one is the lack of data or information in the literature review regarding challenges or difficulties faced in the process to implant digital transformations within the firm in particular by the Irish SMEs. Secondly, information about companies that have started the change does not report any improvement or change in the organization culture as a vital step in the adoption of digital transformation according to the framework adopted by the researcher in this study. Information that is crucial because if people do not accept the innovative technology the process of digital transformation is at risk and therefore there is no information about what situations need to be overcome. Third, because of time constraints, a small sample was selected in this research, and bias and subjectivity are possible, the results may not be entirely conclusive. As a result, there is a necessity to replicate this study to obtain more information from Irish SMEs. After that, further research seeking for practical solutions to these difficulties within the companies.

CHAPTER 4 RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

In this chapter, the author presents the findings and discussion for each facilitator digital transformation factor and makes the suggestion of which factor would be a key challenge for the Irish companies that have participated through its employees. The suggestion is based on a comparison between what the author found and what is described in the Rueckel *et al.* (2020) framework. The author adopted this framework as a unified digital transformation standard for making the comparison.

4.2 Qualitative research findings

The data was gathered through interviews with the plan of gaining deep perspectives from the respondents on the research question based on the developed Rueckel *et al.* (2020) digital transformation framework. This framework divides the company into four layers and four categories and there are two or three facilitator factors in each category. Therefore four explorative objectives were selected one for each category and these categories are Company values, Management capabilities, Company infrastructure, and employee capabilities. These four objectives have the research aim of revealing challenges faced by the Irish SMEs in the retail trade and manufacturing sector in digital transformation in a post covid19 era.

4.2. Objective 1: to investigate the role of organizations values in digital transformation in Ireland, post covid, under the review of organizational culture that is forward-thinking and collaboration.

4.2.1.1. Company organisation values

According to the data gathered only one company presented in its cultural values five key values from a list of thirteen as important values that facilitate digital transformation while the other companies reported just one key value. The I3 recognise that his company is inculcating teamwork, openness to change, communication, customer centricity, and innovation contrasting with three participants that reported teamwork within their organization values. Two more participants recognise trust and just one interviewee accepted willingness to learn as part of the company cultural values. However, there should be in place more key digital transformation values that allow the company to create an innovative culture according to Rueckel *et al* (2020). Additionally, Tuukkanen *et al* (2022) argue that three cultural values are fundamental to adopting digital transformation. These values are, continuous

improvement, transparency, and cooperation within the organization and permit employees development in organization loyalty, to quickly adapt to environmental changes, tolerance for mistakes, and openness to take calculated risks. I think that there is a wide field in organizational values that need to be developed for the success of the digital transformation. Setting again the company organizations values in line with the digital transformation values requires a fostering of digital transformation and is one of the challenges in these participants' companies.

4.2.1.2. Company openness to innovation

Two interviewees said "None" (I1 and I2) while two others recognise that their companies still are at start-ups. Forty three percent of the respondents admit that their companies are open to new ideas or new technology to carry on the daily work.

An interviewee said " There is an ideas reward system, the one that was done recently, a value of €250 was attached to it for the best, for the person with the best ideas and another one €150.00 each was attached for three other people who come second to order for the fourth position. So that puts a kind of challenge on the employee to make sure that they think deeply and come up with ideas that can benefit the organization. And I said that has been working because most of the suggestions made by the employees through the survey are actually implemented by the employer" (I7).

This last company is striving to develop creativity, innovation, and openness to changes in its organizational culture through this idea reward system and in my point of view continuous improvement at every level of the organization. Enriching the organizational culture and preparing the employees for the adoption of digital transformation because it is encouraging to its employees four key values needed to support one of the nine facilitate factors in digital transformation according to Rueckel *et al.* (2020), and given a vital stimulus to the organization culture that according to Ng (2021) a lack of importance on people and organization culture brings the failure in digital adoption. However, there is a need for more projects encouraging creativity and innovations among employees within companies because just one in seven Irish SMEs reported this kind of program.

4.2.1.3. Investment in innovation

Fifty seven percent of the participants reported that their companies were not engaged in any innovative process while the rest of the respondents mentioned that their companies focused on friendly environmental technologies, and benchmarking strategies. One interviewee said "Yes, through IMR (Irish manufacturing Research)" (I3). It is evident that less than 50 percent of the

companies interviewees are investing in innovative technology or in R&D while the majority of the Irish firm participating in the study still remain at the low level of investment reported by Lawless *et al.* (2018) before the pandemic. This finding is not shocking to the author because there is a lack of critical digital transformation values among the companies. As discussed in the company organization values only one company presents in its organizational culture five values from a list of thirteen digital transformation values listed in the framework of Rueckel *et al.*, (2020). Additionally, the low investment in innovation is a difficulty found by Bareto and Leomar (2021) because of the lack of access to capital. However, there is not enough data to support the same explanation in the condition of lack of investment in the Irish SMEs under scrutiny.

4.2.1.4. Importance of internal and external collaboration

The vast majority of participants expressed an active internal collaboration because of the requirement of teamwork to get the job done on a daily basis while external collaboration did not work for all the interviewees. The experienced interviewees in external collaboration expressed a friendly environment to work with external companies as well as experiences in multidisciplinary fields, planning, and work efficiency. One of the interviewees said “the organization has a strong partnership with two other organizations they almost have the same value system that we have. The type of login system that we use is almost similar to their login system then I've been invited over to replace other employees more than four times because our value systems are almost similar and once in a while we have a large gathering where seminars and programs are conducted for all the employees” (I7).

Comparing these findings with the second enable factor of digital adoption described by Rueckel *et al.*, (2020) framework. The majority of the companies present a strong collaboration value embracement.

4.2.2. Objective 2: To explore the role of management capabilities in digital transformation in Ireland, post covid, through strategy integrations and digital leadership

4.2.2.1. The presence of digital business strategy and strategy embeddedness

In this particular section the author came across with the belief from some of the interviewees that digital business strategy is the use of digital media channels only and others participants admit that they even have no idea what a digital business strategy is. Only one interviewee admits that his company has a digital business strategy and the benefits of reaching information and effectiveness in internal and external company procedures and also the use of an internal network for managing and

combining the traditional role of information and the new one. This makes for easier communication within the organization and with the customers. In contrast with the commentaries from the other participants about the use of email, online meetings, traditional post, social media maintenance and leaflet as a manner to share internal or external information. Rueckel *et al.* (2020) describe this third factor as a set of cooperative strategic planning processes that result in an interwoven digital business strategy while also controlling the necessary organizational transformational processes. The author came across with another challenge that the majority of the participants need to cope with. There is a lack of knowledge of what it means to have a digital business strategy and the benefits that it does include.

4.2.2.2. Digital leadership and information management

The majority of the interviewees reported an absence of new technologies in their working companies therefore, there is no specific information management in place whilst one interviewee commented that employees from a specific department within the organization manage the social media channels and internal communications channels. Also, how important messages or information is disclosed to the employees is by emails. Only one interviewee admits that his company has secure management of sensitive data and the company has procedures in place to warranty the security of the information. However, the digital leadership still is passive according to the data gathered from the interviewees and additionally, these findings are in line with the failure in the adoption of digital transformation because there is little importance put on people, organization culture, strategic plan, procedures and lack of knowledge and communications (Ng, 2021). And according to AlNuaimi *et al.* (2022) the digital leadership impacts digital transformation and organizational agility. In addition, Kutnjak (2021) categorised many difficulties in the adoption of digital technologies as the poor strategic vision of top management, ambiguous strategy, low level of awareness in digital transformation, and leadership with no vision of digital transformation among others whilst the EIB (2019) advises that the transition process should be assisted at the business level by changes in culture, leadership, skills, and processes. Rueckel *et al.*, (2020) argue that the digital leadership should be part of the company management board. As a result, digital leadership is another challenge that these Irish SMEs need to pay attention to in the adoption process of digital transformation.

4.2.3. Objective 3: To examine the role of organizational structure in digital transformation in Ireland, post covid, through digital platform infrastructure and processes of institutionalized innovation.

4.2.3.1. Investment in digital technology and data infrastructures

Only two of the interviewees commented that their companies have invested in digital platforms and companies network which amounts to 29 percent of the interviewees. These findings after the pandemic are in line with the Digital Intensity Index (DII) (2020) and (Eurostat, 2021) reveals that a large majority of Irish enterprises with at least ten people employed have a scarcity of digital technologies. The factor of digital platform structures makes it possible for the performance of key organizational functions to be efficient, scalable, reliable, high-quality, and predictable (Rueckel et al., 2020). This is another key challenge that companies under scrutiny have to confront.

4.2.3.2. Appropriate governance and technology innovation

Just one interviewee recognise that his firm has implanted processes and security checks managing the technology and accessing the data and a second one admits that the different IT system running in the company is provided by an outsourcing company. This factor is critical in the technology adoption process because a lack of a strategic plan, processes, and procedural elements in place among others drives to failure (Ng, 2021). As a result, the Bimodal IT structure factor became in a new challenge. This factor sustains solid core infrastructures (Rueckel *et al.*, 2020).

4.2.3.3. Institutionalised innovation processes

One of the interviewees reported that it is the rule when a new employee comes across to the company he or she will receive training in the system functionality for two weeks and if it is needed the old staff will handle more information for the new employee until she or he had enough understanding about the functionality of technology and the system.

Another company innovation process reported was the implementation of a reward ideas system, it is a system that involves the employees at every level in the organization. The ideas system has its rules regarding to how to evaluate every idea and implementation time for those ideas that have been accepted, also the communication process to follow as part of the announcement.

An interviewee said "Currently people and culture department is working on implementing a new information software. This department is asking for our input on how to improve the process and gather essential information" (I5)

These findings are in line with the two profile developments needed in an institution to make it easier for the implementation of digital transformation, and these two profiles are flexibility values and control values (Rueckel *et al.*, 2020). However, it is necessary that more Irish firms implement these structures because only 29 percent of the interviewees have experimented with it. Therefore the

factor of the institutionalized innovation process is another challenge that the rest of the companies' interviewees have to face in the digital path.

4.2.4. Objective 4: To inspect the workforce capabilities structure in digital transformation in Ireland, post covid, under the factors of creativity, innovation capabilities, and information and communication technology.

4.2.4.1. Individual Creativity and innovation capabilities

The majority of interviewees point to solving issues in teamwork, collaboration, internet use, lesson learning, doing a report, and the use of software on a daily basis and they also said there was freedom to generate solution ideas which are discussed as a team and they get feedback if there is any issue after implementation. However, there is a minority who reported a passive approach to problem-solving. According to Rueckel *et al.* (2020) this factor is described as the capacity of a person to think creatively, collaborate creatively, and put innovations into practice. As a result of the comparison of the finding and the factor meaning and elements, the author believes that this group of companies is doing well.

4.2.4.2. Information communication technology literacy and development

According to the previous findings, not all the interviewees have access to internal networks or digital platforms which facilitates the management of information. Instead of that, some interviewees are using some software that assists them to get the job done on a daily basis. So the majority of training reported is in these kinds of technology that is part of the ICT literacy, on the other hand, the interviewees that admit that their companies are working platforms reported a private training company and training through SKILLNET Ireland. These companies that are using platforms are well on their way to fulfilling this fundamental digital transformation factor because they are complying with the meaning of ICT literacy in Rueckel *et al.* (2020) framework.

Another finding that drove the attention of the author was that according to the data gathered 71 percent of the interviewees are using computing to get the job done and this is a result slightly different than the reported for the year 2019 which was 58 percent (OECD. Stat, 2022). However, a larger sample is needed to fairly compare if there is an increase of 12 percent after the pandemic.

CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The primary objective of this study was to elaborate on a list of indicators that identify the internal company weaknesses in digital transformation. The current literature review gave inside to a multithemed body of knowledge regarding to digital transformation from which the author adopted a digital transformation framework to be used as a standard in the research planning, especially, in the critical processes of data gathered and data evaluation, as a result, this exploratory study was able to answer in chapter 4 the research questions presented in section 1.5.

The author is presenting in a synthetic manner the digital transformation challenges according to Rueckel *et al.* framework (2020).

There are nine factors and the Irish firm under study have implemented good Collaboration both internally and externally, Information communication technology literacy and development regarding to the level of digitalization in each company, for example, the use of software on the daily basis and its respective training. However, there is a lack in the use of platforms and networks in some companies that have to be addressed and then build the skills in its employees.

Another factor well implemented is Individual creativity and innovation capabilities and despite the fact that low level of investment in innovative technologies in the organization (Lawless *et al.*, 2018), the vast majority of employees are working as a team presenting and developing ideas to solve problems. As a result, just these discussed three digital enabling factors are working well.

The six factors that need to be developed and well implemented among the majority of the participants firms in this research are organizational culture that is forward-thinking and is an element in the normative company layer, strategy integration and digital leadership both are elements of the strategic company layer, and the three elements into the tactical layer digital platform and bimodal IT structures and processes of institutionalized innovation.

The author considered that from the six lacking factors two of them are extremely vital to develop because they assist in the functionality of the other factors. These extremely vital factors are digital leadership and organizational culture that is forward-thinking.

5.1.1 Why its vital that the organizational culture is forward-thinking

According to many authors in the literature review (Tuukkanen *et al.*, 2022) &(Rueckel *et al*, 2020) & (ng,2020) & (Vial, 2019) & (EIB, 2019) the alignment in culture toward the digital adoption prevents the failure in the process of implementation. Therefore new cultural values must be developed that allow the employees at every level to be open minded to the internal company evolution and increase the employees synergies to embrace the change as Hanelt *et al.* (2020) describe digital transformation a constant evolution process that provokes additional continuous changes. Because this is a weak element among the companies under scrutiny and the majority of the companies reported a lack of investment in new technologies even though Irish SMEs had significantly lower levels of indebtedness and leverage in the years preceding the pandemic (McQuinn and McCann, 2017). So one of the author recommendations for further academic research on this topic is Organisation culture and investment level in innovation processes.

5.1.2 The figure for digital leadership

This is a significant element because digital leadership plays a role in two company layers strategic and tactical which are compounded by five digital transformational elements in total according to the Rueckel *et al.* (2020) framework that means 56 percent of the success is under the digital leadership role by direct or indirect management so a misunderstanding in the role would have a negative impact in the adoption of new technologies. Research done on the difficulties faced by firms in digital transformation found many problems and among them the change of internal systems, new ways to work, lack of comprehension or knowledge, mistrust in modernization, lack of comprehension of the need to expand the number of IT experts, standards deficiency, poor strategic vision of top management, ambiguous strategy, leadership with no vision of digital transformation (Kutnjak, 2021).

- And the more recurrent difficulties in digital transformation within organizations are then the more the necessity of new knowledge to upgrade digital skills, misunderstanding and mistrust in digital transformation, regulatory limitations and the lack of digital abilities and expertise (Kutnjak, 2021) and to make the scenario worse is if all of those limitations are present in the digital leadership or in the organisation team manager then it is going to be difficult for companies to move forward along to digital transformations. A fact is that SME managers are unaware of the opportunities and benefits of digitalization (EIB, 2019).

5.2 Recommendations

5.2.1 Further research

As presented in the conclusions the necessity of knowledge in the interaction of two digital transformation pillars, organisation culture and investment level in innovation processes as well, will determine how strong this relationship is between elements and generate more knowledge on the topic of organisational digital transformation culture in ROI which is one of the areas in the body of knowledge with a scarcity of studies. As the author mentioned before the culture plays a significant role in driving the change among the companies and many studies support this point and taking into consideration that the Irish SMEs had a low level of indebtedness before Covid19 (McQuinn and McCann, 2017) and a low level in technology investment (OECD. Stat, 2022) and according to the findings in this study, a low level of digital transformational culture measured by the application of Rueckel et al. (2020) framework. An author's suggestion is the replication of this study in order to gather more crucial information that allows making statistical inferences and fairly represents the Irish SMEs digital transformation conditions.

5.2.2 Professional

The overall findings in this current research are based on seven semi structured interviews among employees from different companies so still there are many avenues to be explored in this field. To unfold the knowledge that still remains blurry, it is necessarily that more professionals replicate this current study involving a large number of Irish SMEs and create a solid foundation for further research and managers. Therefore this current research cannot yet offer clear guidance or recommendations to professionals or managers. This research found differences between organizational culture, organizational values, and digital transformation levels and in order to operationalise this, professionals should be doing first more studies with the same scope.

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Appendices

Semi structured instrument.

Are you working in an Irish small or medium enterprise?

What kind of services or products are sold by the company?

How long have you been working in the company?

1. Investigate the role of organizations' values in DT in Ireland, post covid, under the review of organizational culture that is forward-thinking and collaboration.

Forward-thinking

1.1 What organization values are cultivated in its employees?

1.2 What is the organization level in innovation according to your experience?

1.3 Do you know if the company has ever been engaged in an innovation process?
How? (investment)

Collaboration

1.4 How is the collaboration between the company employees? (Active or passive)

1.5 Have you had any working experience collaborating with external service companies? How was?

(company - start-ups or innovation process)

2. Explore the role of management capabilities in DT in Ireland, post covid, through strategy integrations and digital leadership.

Strategy integration

2.1 Do the company has a digital business strategy? (Explain or If it is please continue in question 2.2)

2.2 How does the company combine the traditional role of information and the new one? (example: traditional post – emails – or information from a web page or social media, software, network)

Digital Leadership

2.3 According to your observations in the company, How the new technology is managed? (responsible for, information/communication, processes or guidelines, and issues or maintenance)

2.4 How does the person in charge of the new technology share the importance of the new processes or information (if the company does not have an assigned person in charge please go to the following questions)

3. Examine the role of organizational structure in DT in Ireland, post covid, through digital platform infrastructure and processes of institutionalized innovation.

Digital Platform structures

3.1 what digital platform or software is used in the company and how is it works? If there is not any go to the 3.3 question?

Bimodal IT structures (Two modes: One focuses on all technology and applications that absolutely need attention, and focuses solely on innovation)

3.2 How is managed the different IT systems? (the different applications and innovation)

Institutionalized innovation process (Employee empowerment)

3.3 Are there any organizational guidelines to encourage employees on how they can use the technology efficiently? How does this guideline help? if there is no new technology Are there any organizational guidelines to encourage employees on how they can give ideas to change processes?

4. Inspect the workforce capabilities structure in DT in Ireland, post covid, under the factors of creativity, innovation capabilities, and information and communication technology.

Individual creativity and innovation capabilities

4.1 how do the employees solve issues on daily basis?

4.2 how do the managers handle the employees' ideas to solve problems?

ICT literacy

4.3 how do the employees use the new technology to integrate, evaluate and create information?

4.4 is there any training in technology provided to the employees? (example: software / digital media / change in organizational culture / Organizational values / managing the change or any other please explain)

Framework developed by Rueckel et al (2020)

Table 5 – Digital Transformation Enabling Framework			
Layer	Category	Enabling Factor	Short Description
Normative	Organizational Values	Innovative organizational culture	A company culture that fosters innovation, creativity, and an entrepreneurial mindset in its employees by cultivating openness toward change, agility, tolerance of failure, willingness to learn, participation, trust, risk affinity, entrepreneurship, innovation, cooperation, communication, innovation, and customer-centricity as central organizational values.
		Internal and external collaboration	A value structure within a company that fosters cooperation and problem-solving between its employees, independent of their specific roles and departments. It also fosters the inclusion of third parties within all steps of an innovation process following the paradigm of open innovation.
Strategic	Management Capabilities	Strategic embeddedness	A set of collaborative strategizing processes resulting in an interwoven DBS which also governs the necessary transformational processes within the organization.
		Digital leadership	A management board which includes a member, fulfilling the role of IT orchestrator that has reached a mutual accord to view digital technology as an asset and recognize its strategic or turnaround orientation.
Tactical	Organizational Infrastructure	Digital platform infrastructures	An integrated infrastructure created by investment in digital technology and data infrastructures, digitized business processes, and electronic linkages to external parties that enables efficiency, scalability, reliability, high quality, and the predictable execution of core organizational operations.
		Bimodal IT structures	Infrastructures that enable the IT function to develop and maintain stable core infrastructures by exploiting the existing organizational model while simultaneously enabling the rapid exploration and implementation of innovative uses of digital technology.
		Institutionalized innovation processes	A set of systematic processes aligned with the individual organizational setting that imposes structural value profiles encouraging efficiency, productivity, stability, and structure on an organization's innovation environment that is generally based on flexibility value profiles such as creativity, individual empowerment, and change.
Operational	Workforce Capabilities	Individual creativity and innovation capabilities	An individual's capability to think creatively, work creatively with others, and implement innovations.
		ICT literacy	An individual's capability for using digital technology, communications tools, and networks to access, manage, integrate, evaluate, and create information to function in a knowledge society, and at its highest level, enable innovation, individual transformation, and societal change.