FORCED DIGITALIZATION IN TIMES OF CRISIS

An exploratory study of Danish universities during 2020 COVID-19 pandemic

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Abstract

Digitalization is a known phenomenon that has experienced an exponential growth in the last two decades and is being used in different industries by organizations, although not at the same level. In the context of the COVID-19 pandemic, the rate of adopting and using digitalization has exponentially increased as for the many organizations represented the only way to ensure their continuity. Taking into account this exceptional setting, the thesis focuses on the educational sector, which urgently needed to incorporate new digital solutions, given the pandemic restrictions. We propose the concept of "forced digitalization" in order to understand the experience of these organizations, and research the effects and sustainability of the changes brought by forced digitalization.

In order to answer these, we chose to gather empirical qualitative data from eight universities in Denmark through in-depth interviews, each one of them with different educational profiles. The participants were people that had direct implication with adopting digitalization within their universities. The analysis of this data helped us identify and conceptualize the phenomenon of "forced digitalization".

The analysis and findings of this paper reflect that the digitalization undergone in the Danish universities was forced upon them and this can be seen from different perspectives by using the Embedded Digitalization model as an analytical framework. With the purpose to answer the research questions, this thesis proposed a revised application model that can be applied in crisis periods through which a university can better manage the forced digitalization by taking into account the institutional context.

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1. Introduction

The use of digital technologies lies at the basis of any business and institution in today's world, and we can see advancements appearing from all the corners of the world, all dedicated towards making human life better and more comfortable. The world is now more connected than ever, with people around the globe benefiting from instant video conferences, the ability to work remotely online in a multitude of industries, access to an infinite amount of data just at the tip of their fingers and the ability to adapt to different scenarios with the use of technology. This has proven to be of great use when a crisis has covered the world and pushed the civilization in isolation.

The COVID-19 pandemic that emerged at the beginning of 2020, has had a wide variety of consequences for all businesses and organizations, regardless of the industry. It forced government to push their country into a lockdown in order to contain the spread of the virus, which meant that any type of activity that would involve social interaction was restricted, pushing entities towards finding a solution to remain active. This was the case for the educational industry as well, with schools and universities being affected at all levels.

This thesis is based on the premise that the pandemic has caused universities to search for digital solutions that would allow them to continue their practices during a full lockdown, where any unnecessary physical interaction was prohibited. The idea spurred from the fact that at the time, we were students in a Danish university and had direct experience with part of the digitalization processes that the university adopted during the pandemic, through online courses and digital exams.

In general, digitalization is a process that has specific requirements in order to be adopted for use. This is a meticulous process that takes time planning and testing. The belief is that the Danish universities were pushed, by the governmental restrictions and regulations imposed, to start conducting their activities online. Briefly said, we believe they were forced to undergo different digitalization processes as all the changes needed to happen in a matter of days which had different effects over the entire organization.

To create a base of understanding for the effects resulting from this forced digitalization, we have decided to conduct interviews with representatives of Danish universities in search of information that would reveal to what extent they have chosen to adopt digitalization processes during this pandemic. The group consists of eight specialists with direct implications on digitalization, from Danish universities around Denmark with different profiles. Their commonality lies in the fact that all those universities consider themselves as being on campus teaching.

Continuing with expanding the understanding base of our project, we find it of paramount importance to mention that with digitalization we do not examine what was newly invented or produced to battle the new way of working. We saw that digitalization was already present in the universities by having certain departments responsible for the digitalization, representatives that occupy functions related to digitalization or professors that teach digitalization. With this in mind, universities already made use of IT and digitalization and the majority already had the tools to battle this new way of teaching. The only problem is just how to scale it up, and do it fast.

We will present the existing theory on digitalization and use the model published in 2014 by Terje Colbjørnsen, Embedded Digitalization, that will provide a set-up for understanding the effects of forced digitalization within the Danish Universities.

Combining the existing theory with our own data, we will prove the need for introducing the concept of "forced digitalization", as well as the need to rethink and adapt the above-mentioned model.

2. Research Question

To be able to understand how the pandemic affected the adoption of digitalization processes in the Danish universities, the following research question has been posed:

How did Danish universities experience the implementation of digitalization to combat the crisis of the 2020 COVID-19 pandemic, and how did the changes brought by digitalization affected their practices?

In order to provide a complete and detailed answer to the research question, the following sub questions have been created:

1. *What were the effects of the forced digitalization?*
2. *How was the adoption of digitalization experienced by Danish universities?*
3. *How are these changes viewed by universities post-pandemic?*
4. *How can the ED model be applied in the case of Danish universities?*

3. Background information

For many years, Denmark is a country where innovation and the push of digitalization is very well viewed and supported by the government and the market. Following this idea, the Danish universities are no strangers to this fact. Even before the repercussions of the COVID-19 pandemic, educational institutions were familiar with the use of technology that will augment the work they are conducting, both internally and externally.

From our personal experience as students and from the data collected through the interviews for this research, it became obvious to us the level of technological use that is present in universities. It is known that the IT department is making more use of IT and digital tools (i.e.: video calling software to conduct meetings) and they were able to work remotely. Moreover, any type of information could be found online on the universities' platforms and there were departments especially made for digitalization. All these above prove to some extent the fact that digitalization was embedded within the industry. While these facts should have made it easy for universities to adapt to changes, that was not necessarily the case when it came to confront a difficult crisis.

The context of our project is set within the beginning of the crisis that had a global outburst in the beginning of 2020. In their work entitled *Exploitation and exploration of IT in times of pandemic: from dealing with emergency to institutionalizing crisis practices*, Andrea et al. specified that:

"A crisis can be defined as a sudden, low-probability but high-consequence event that causes a major threat to one or several actors, individual or organizational (or even to society), leaving them with little time to respond and who then must face the resulting profound disruption of their practices and social norms." (Carugati et al., 2020, p. 2)

Based on this knowledge, we therefore consider the coronavirus (COVID-19) pandemic of 2020 as a crisis that affected all the industries worldwide. Due to the rapid outburst of this virus, it has brought an immense danger to human health, a health crisis that the world had to grapple with and a significant commercial impact that has strongly impacted the way people carried on their lives.

To understand how the choices made by the Danish government affected universities and how they approach digitalization, we will first offer an understanding on the steps taken to combat the spread of the virus. Denmark is still, as well as the rest of the world, impacted by the coronavirus (COVID-19). The lockdown period in Denmark began on 13th of March after the number of cases in the country reached a staggering 514 on 11th of March, the day the Prime Minister of Denmark, Mette Frederisken, announced the measures taken by the government (*Danmark lukker ned*, 2020). The initial measures included that mass gatherings, businesses and educational establishments should be prohibited and closed for physical attendance. This has culminated with closing borders for international travelling (Milne, 2020).

The lockdown was initiated on the 13th of March and it applied to all organizations that would require a physical interaction. This lockdown was initially planned for a period of two weeks, but due to the high rate of spread, it was prolonged by another two weeks. While the educational establishments were forced to close their doors for physical activities, they still had the responsibility to continue the compulsory education. For this, teachers and professors were compelled to do their job through distance learning from home (*Denmark*, 2020).

Subsequently, this has affected all students, professors, administrative staff in Denmark's higher education institutions. On 6th of April, the government announced a gradual reopening of the educational establishments. This gradual reopening allowed the universities to return to some of their practices on campus, but they were limited in terms of how many people can attend, meaning that the universities still had to continue the use of the digital solutions.

The project will set lenses on the universities in Denmark with aim of understanding how the outburst of the pandemic has affected their core business activity. Following this train of thought, the increased adoption of digitalization acted as a catalyst for the universities in

getting back on the rails and continuing the educational activity, but has come with side-effects of which we do not completely currently comprehend. Those side-effects could stem from whether the adoption of digitalization was forced or not, how has this affected the universities, and if these changes will be sustainable in a non-pandemic world.

4. Literature Review

4.1. Digitalization

Today, digitalization has managed to be introduced in all aspects that concern human life and beyond that, where any person can make use of digital technologies and software just by reaching in their pocket and taking out their mobile phone. As said by Christine Balagué:

"any individual equipped with a mobile phone can now become a producer, create services, or at least place services on offer' for the purpose of earning a little spare cash, making it through to the next salary payment, or topping up their benefits." (Degryse, 2016, p. 6)

In general, the concept of digitalization in an organization is pushed towards development and implementation by the leadership, as change cannot occur without the drive of their leaders. In their publication, Fahlberg and Ositadinma mention that *"digitalization in an organization cannot occur without the leaders initiating and spearheading it. Thus, digitalization works in tandem with leadership."* (Kazper & Ositadinma, 2020)

As the focus of this research is to understand the effects of digitalization in Danish universities, leadership will not present a primary focus, but rather considered in connection with other factors.

The concept of digitalization has been present for many years and still, the literature around this concept is in good need of adaptation and completion. To that end, this section will go through the concept of digitalization to understand the terminology, different definitions given from different perspectives, and how the knowledge will further be used to understand the effects of digitalization upon universities in times of crisis, like the COVID-19 pandemic in Denmark. Moreover, we have identified the potential gap between the digitalization and how it behaves as a result of an exogenous shock on the institutional context.

4.1.1. Different Terminology

When researching digitalization, three main terms are most commonly met: digitization, digitalization, and digital transformation. In their essence, all terms have different meanings and rely on each other in order to happen. The term this paper will focus on will be *digitalization*, but to avoid confusion and misunderstanding, we will go through all three terms in order to point out the differences between them.

In their paper, Dietrichson & Kragh employ the understanding of digitization as presented by Parviainen et al. in 2017, where it is mentioned that the term of digitization should never be confused with the term of digitalization, as digitization refers to "*the distinct process of making analog information digital."*(Dietrichson & Kragh, Ulrik, 2019, p. 2)

Furthermore, Dietrichson & Kragh continue to use the understandings of Parviainen et al. from 2017, defining digitalization as:

"*within a business context can be described as digital data made available to computers and software, allowing existing processes to become automated as well as allowing new kinds of processes."* (Dietrichson & Kragh, Ulrik, 2019)

Even if the authors refer to digitalization in the business context, the same concepts can be applied to the universities, as both of them share features of being an organization.

In the International Journal of Information Systems and Project Management from 2017, the digital transformation is referred to as *"the changes associated with the application of digital technology in all aspects of human society"* (Parviainen et al., 2017, p. 64).

In an organization, digital transformation can be understood as transforming an entire system, like the payment system going step by step through digitization (converting tangible currency to digital one), digitalization (having different systems and payment methods to use for that digital currency), and ending with the digital transformation of the entire concept of payment, where digital currency is used more than a tangible one.

A very good example of the difference between digitization and digitalization is given by the International Journal of Information Systems and Project Management, involving the Finnish Tax Administration. If the Tax Administration was interested in having digitized a

process, they would have chosen to replace the regular paper tax reporting with a digital tax reporting, together with implementing the possibility of digitally upload receipts or other certificates. Instead, the Tax Administration moved on and changed different parts of the system, renewing the entire process, so that the Tax Administration would electronically review tax information directly delivered to them by employers, organizations, banks, and any form of personal income, followed by the Tax Administration sending out taxing proposals to be reviewed by the citizens. If all is in order, the citizens do not have to do anything in regards to that (Parviainen et al., 2017).

In a university, digitization would be considered the movement of teaching support materials from physical (i.e.: on paper, on chalkboard/blackboard/whiteboard) to digital presentations (i.e.: PowerPoint presentations, PDF files). Digitalization would be employing certain software or digital technologies to adapt and improve deliverability of classes, conducting exams, and administrative tasks.

With the understanding of the different terms used when talking about digitalization, we will move further to see the different views researchers have on the process of digitalization when it comes to the business environment and organizations such as universities.

4.1.2. Definitions and understandings

Many researchers take the basic understanding of digitalization and tailor it to serve their research purposes, a process we will also consider in this journey. Digitalization is understood by McQuail, and later on, rendered by Colbjørnsen to understand digitalization in media, as:

"*General word for the computerization of all data transmission, storage and processing employing the binary code, and as such the basis for convergence of media. It is currently best known in reference to the replacement of analogue by digital transmission of television signals, leading to a large increase in potential channel capacity and scope for interactivity"* (Colbjørnsen, 2014b, p. 3).

Although the definition above is given in the research of the media industry, it exemplifies perfectly the difference between digitization and digitalization, as digitization implies the transformation of data from analog to digital (binary code), whereas the

digitalization covers the use of that transformation in an industry, the examples here being data transmission, storage, and processing.

In their paper from 2015, Gray and Rumpe refers to the work made public by Gartner and defines digitalization as:

"Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business." (Gray & Rumpe, 2015, p. 1).

From this business understanding of digitalization, Parviainen et al. goes deeper and mentions that digitalization is also known as: *"ability to turn existing products or services into digital variants, and thus offer advantages over tangible products"* (Parviainen et al., 2017, p. 64). This implies that there are many different types of digitalization processes that can affect both products and services in different areas of the company. This can be also the case for universities, as it can be considered that they deliver knowledge as a service, generally through courses and laboratory practices.

Moreover, Parviainen et al. cites Brennen and Kreiss, by mentioning their understanding of digitalization: *"the adoption or increase in use of digital or computer technology by an organization, industry, country, etc."* (Parviainen et al., 2017).This in terms refer to the use of existing digital technologies that can be applied not only in the business environment but also at an industry level.

Another perspective is given by Hagberg et al., which states that *"Digitalization: Integration of digital technologies into everyday life by the digitization of everything that can be digitized'* (Hagberg et al., 2016, p. 2). This furthermore cements the idea that digitalization does not refer to the conversion of analog to digital, which it is defined as digitization, but using digital technologies available on the market to augment the day to day life.

All the perspectives regarding digitalization that were presented above share, to some extent, the same understandings and the same meanings behind this concept, which basically is the use of digital technologies to serve different needs, to automate and create more value and ultimately improve the day to day life, giving people access to a larger variety of choices at the tip of their finger. For the purpose of this paper, we will be employing the same understanding of the concept of digitalization.

4.1.3. The use in this paper

With a clear distinction between digitization and digitalization, we choose to further use the term "digitalization" for the purpose of this paper. We will now move on to understanding how the term of digitalization will be used in order to explore the effects digitalization can have on a university.

As mentioned in the previous section, digitalization has a broad definition and understanding when used in research. It is not the focus on transforming analog data to digital, but the use of digital technologies that are available on the market to create or improve services, products, organizational aspects, practices, and many more different areas of an organization.

For the purpose of this research, we will consider digitalization as any changes brought into Danish universities during the COVID-19 pandemic and lockdown from 2020 in Denmark, which implies the use and integration of digital technologies, both new and existing. Furthermore, we as researchers will be employing the understanding of digitalization presented by the IJISPM, which states that digitalization is the ability to adapt existing physical products and services to digital ones (Parviainen et al., 2017).

In this case, we will not look for new technologies or innovation that were made during the crisis, but more at the different type of technologies that universities decided to either introduce, implement or extend the use of existing ones so that they would have the ability to continue to work partially or fully remotely and continue their activities of educating students.

4.2. Embedded digitalization

Digitalization can be compared to different other concepts that made their way from vision to reality, and just like those concepts, it requires time for it to be understood; to be equally integrated and distributed among the industries that can benefit from it; to be regulated so that it brings value both to the user and to the creator.

A good example here can be brought up from the concept of Big Data. Its existence can be traced back to a few decades and the process of understanding, adoption, usage, regulation, and in the end, literature has evolved step by step. Furthermore, the literature on

Big Data shows that there was a gap between each of the steps, leaving regulations and literature in need of catching up. (Osman et al., 2019)

As mentioned before, the literature around the concept of digitalization and its multiple implications in the day to day life, both professional and personal, is in need of development. To that extent, this section will focus on understanding how digitalization is embedded in the industries and how this knowledge can be transcribed into a model that can analyze digitalization.

4.2.1. Embeddedness

The concept of embeddedness is found to have strong ties to the new institutionalism, a social scientific program linked to the organizational studies, that is building on a classical understanding of the sociological theories of institutions (Colbjørnsen, 2014b).

Moreover, it has been argued that it is also marking a breakthrough with these theories to develop new ideas of how symbols, myths, discourses, and interior cognitive understandings "shape social actions". Colbjørnsen continues and brings up the works of Meyer & Rowan from 1977 and DiMaggio & Powell from 1991, referring to their works as "helping to define and elaborate the field". (Colbjørnsen, 2014b, p. 4)

The aforementioned concept has emerged as a key term in institutionalist theories in the '80s and '90s, but the initial date back to the '50s, fact enforced by Colbjørnsen by mentioning the works of Karl Polanyi published in 1957, and quoting his use of the term: *"the human economy (…) is embedded and enmeshed in institutions, economic and noneconomic"* (Colbjørnsen, 2014b, p. 4)

Embeddedness, in the original economical usage of the term, refers to the level at which economic activity can be constrained by factors that are non-economical. This argument is strengthened by Colbjørnsen using the publications of Mark Granovetter, *Economic action and social structure: The problem of embeddedness* from 1985, and cites that:

"Actors do not behave or decide as atoms outside a social context, nor do they adhere slavishly to a social script written for them by the particular intersection of social categories

that they happen to occupy. Their attempts at purposive action are instead embedded in concrete, ongoing systems of social relations." (Colbjørnsen, 2014b, p. 5)

What Granovetter is trying to point out here is that in any given environment or social context, actors are making decisions based on what information is given to them and what they witness happening around them. Moreover, Granovetter (1985) and Colbjørnsen (2014b) believe that these actions are driven by factors embedded in society, which in this particular case is considered digitalization (Colbjørnsen, 2014b; Granovetter, 1985)

Researchers in the field, as seen above from the publications of Granovetter (1985) and Polanyi et al. (1957) place the concept of embeddedness in relation to economic actions (Polanyi et al., 1957). Moreover, Colbjørnsen makes use of this concept by placing it in the media industry, and arguing that:

"embeddedness can also be applied to constraints and frameworks for technological innovation in the media industries, what I refer to as digitalization. Although I would argue that this conceptualization remains an original contribution to the field of media innovation studies, the central concept has already been proven applicable in multiple settings." (Colbjørnsen, 2014b, p. 5)

Following Colbjørnsen's application of the concept of embeddedness in the media industry to understand the usage of innovative technology, that he refers to as digitalization, and that he consequently pointed that it can be applied in other situations as well, we as researchers propose that it can be used in studying the process of digitalization in universities. To that end, stronger arguments will be brought forward to enforce the theory Colbjørnsen has that *"technology or technological processes are seen as embedded within non-technological contexts"* (Colbjørnsen, 2014b, p. 5)

4.2.2. Embedded Digitalization: the model

As a model, Embedded Digitalization (ED) was first introduced to the library of academic knowledge in 2015 by Terje Colbjørnsen, in his Ph.D. thesis *Continuity in change: Case studies of digitalization and innovation in the Norwegian book industry 2008-2012* (Colbjørnsen, 2014a). The model was constructed initially with the purpose of observing and

analyzing digitalization as being a process that is taking place within an institutional framework.

Colbjørnsen argues that the ED model, in part, was inspired and created by the research of another academia, Richard Peterson, whose work was published within the "production of culture" perspective. Peterson argued in his different publications that the production of cultural goods can be seen through a number of "constraints or facets" (Colbjørnsen, 2014a).

In the published work co-authored with Nicholas Anand, Peterson suggests that the facets aforementioned include technology, law and regulation, industry structure, organization structure, occupational careers, and market (Peterson & Anand, 2004). Furthermore, Colbjørnsen refers to another point in the work of Anand and Peterson, that "r*apid change exposes the constituent elements comprising a field of symbolic production composed of six facets*", making it possible for digitalization to be "*observed through the facets*" (Colbjørnsen, 2014b, p. 6).

Based on the work of Anand and Peterson, Colbjørnsen continues on articulating his own perspective of the facets, using five of them in his creation of the Embedded Digitalization model. These facets are as follows: Industry structure, organizational structure, technology, market, and policy and regulations. Furthermore, Colbjørnsen points out that these five facets employed by him in his model are the conditions of embeddedness. Below, in Figure 1, the model can be seen in its basic and simplest configuration:

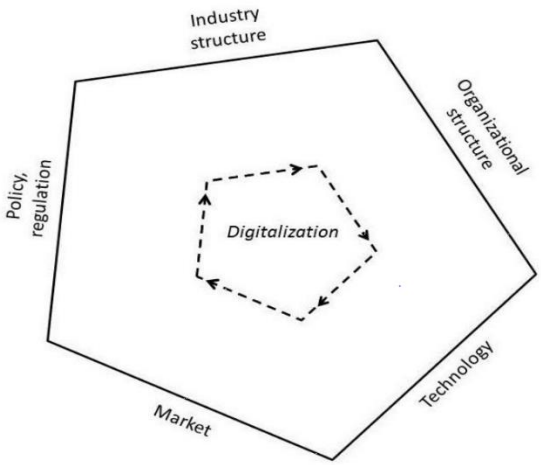

Figure 1- : The Embedded Digitalization Model (Colbjørnsen, 2014: p. 6)

"How do we, as researchers, approach digitalization if we accept that it is a multi-faceted process involving more than technology? What I propose is that we view digitalization not as a process which enters exogenously or as a shock, but is rather embedded within an existing framework." (Colbjørnsen, 2014b, p. 6)

Colbjørnsen brings forth the argument that digitalization is a multifaceted process, a process that is affected by multiple factors and the outcome is dictated by the facets. He follows-up by proposing that the concept of digitalization can be analyzed by examining each of the facets in turn, as looking through a prism.

This suggestion comes with a few advantages: firstly, it offers a practical, reliable way of analyzing and researching a complex phenomenon; secondly, the proposition comes with multiple entry points for examining a phenomenon and thus enabling a multi-faceted perspective; lastly, it provides a guide into the actual perspectives used by the researchers, rather than only showing forth the object of study.

As mentioned before, the process of digitalization is affected by each one of the five facets, which means that from an analytical point of view, the ED model can be adapted as seen below in Figure 2:

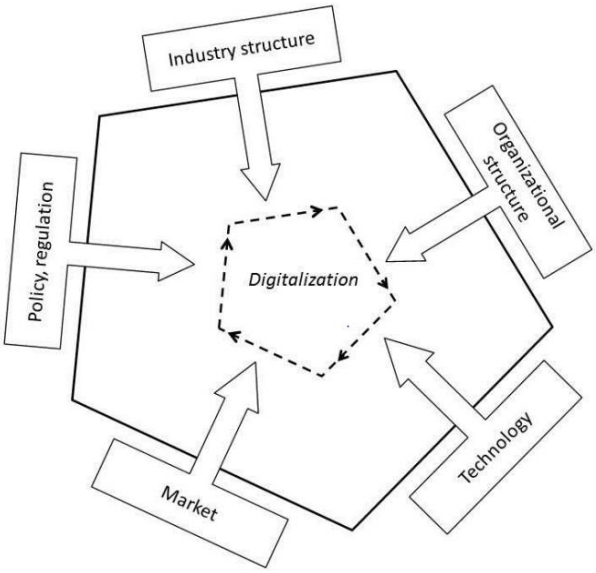

Figure 2- ED as an analytical starting point (Colbjørnsen, 2014: p. 7)

In his Ph.D. thesis, Colbjørnsen discovered that the five facets displayed in the figure above can be considered important when it concerns the study of digitalization in the Norwegian book industry. Furthermore, he mentioned that *"other facets may be more important for other industries, but the structure will remain alike or similar"* (Colbjørnsen, 2014b, p. 7)

Based on the use and results of this model by Colbjørnsen, the working assumption we employ as researchers is that these five facets used in examining the digitalization in the Norwegian book industry can be applied to the research on the effects of forced digitalization in Danish universities during a crisis, such as the COVID-19 pandemic that started in 2020.

In the following subsections, we provide a detailed overview of what each of the facets, as explained by Colbjørnsen.

4.2.2.1. Industry structure

Colbjørnsen believes that digitalization is embedded within an industry, making the structure of an industry one of the most important facets. To understand why and how digitalization is embedded in different industries, one must first gather the right knowledge and overview of all the aspects, actors, and factors that create an industry structure.

There are many aspects that need to be considered when approaching the industry structure. Researchers must first understand how any specific industry is organized, how it works, what connections it relies on, the degree of vertical and horizontal integration, ownership, and other factors that may be critical for their analysis.

This facet is opened to adaptation in order to fit the needs of each individual industry and it cannot be generalized for all the industries, as the importance of the factors part of this facet differs from one industry to another.

4.2.2.2. Organizational structure

In creating the ED model, Colbjørnsen views organizational structure as the facet that will allow the researchers to understand how digitalization processes were managed in a specific case. Typically, this implies looking at the decision-making process in adopting

digitalization, who was responsible within the organization, how many people were involved, what was the departmental structure at the time of the changes, in-house or out-sourced, etc.

With digitalization considered to be embedded at an industry level, it can also be argued that is embedded at an organizational level. Being part of an industry, the organizations will have to adhere to the written and unwritten rules of the said industry to successfully be part of it, which has a high probability of directing an organization to adopt a digitalization process that is embedded in the industry in order to remain competitive.

4.2.2.3. Technology

It is impossible not to consider technology as one of the most important facets when talking about digitalization, as it stands at the base of starting any digitalization process. Following that train of thought, this facet will not be treated as the dominant factor, but it remains crucial in understanding digitalization.

The digital era we are part of now innovates the world on a daily basis. Whether it is for personal or professional use, people today have access to a variety of hardware platforms, software formats, digital concepts, and digital technologies that augment value creation.

"The researcher should seek to examine all available options and ascertain the consequences of choosing one over any other." (Colbjørnsen, 2014b, p. 8). Colbjørnsen's view on this facet is that researchers should try to examine all technologies, both hardware and software, that were considered in making the choice to digitalize, as it can be crucial in understanding digitalization.

4.2.2.4. Market

Understanding the market where digitalization processes are analyzed has its own importance in comprehending digitalization overall.

"Digitalization tends to make boundaries between previously distinct markets more ambiguous. Especially, distribution barriers are more easily overcome, even if language and cultural barriers remain significant for the delineation of markets." (Colbjørnsen, 2014b, p. 8)

While before there was a clear distinction between brick and mortar and digital representative of the market, now the line that separates the sides becomes blurry, making it hard to be identified as pertaining to one area or the other. Digitalization is the main factor that erased the defined lines, making digitalization processes the key component for analog to join a digital market.

4.2.2.5. Policy and regulations

Concepts such as digitalization that are subject to governmental control, are prone to be regulated and have policies created, with the aim of controlling and directing the evolution of these concepts.

"Regarding digitalization, the widespread differential treatment of digital and analogue goods and services in terms of value added tax is indicative. The important financial contribution by the government means legitimation work is a key concern of (...) representatives, both in direct political lobbying and in public debate. " (Colbjørnsen, 2014b, p. 8)

Colbjørnsen refers to the level on which digital differs from analogue in terms of taxation. Moreover, it has been seen that with other concepts involving technology and information sharing, such as Big Data, the laws and regulations around it are always updated and always subject to change in order to ensure that the concept does not negatively impact the society.

It is important for researchers to understand both the policies and regulations that are directly affecting digitalization, but also how these laws are affected by digitalization.

5. Analytical framework

As researchers, we are concerned with the reality and knowledge that surrounds the phenomena we intend to study, in our case forced digitalization.

Arguing for why we have chosen Embedded Digitalization (ED) as our analytical framework, it is important to set the environment in which this framework can be applied. According to the work done by Colbjørnson (2014a) in which he developed ED we are looking at making use of the institutional framework.

"The Embedded Digitalization (ED) model is construed as a way of observing and analysing digitalization as a process taking place within an institutional framework." (Colbjørnsen, 2014b, p. 5)

In this research paper, we are dealing with institutions of higher education and research which award academic degrees in various disciplines and fields, and for the scope of our project they practice their activities on campus. The central keyword here is institution and understanding what an institution is will lead us to a better understanding of why this model can be applied to the Danish universities.

Institutional theories have behind a long history in the social sciences which started from Philip Selznick, who is a central and historical figure in the field of institutional theory, up to Emile Durkheim's work and definition of institutions (Hinings & Greenwood, 2000).

In his doctoral thesis, Colbjørnson presents the definition of an institution by Durkheim as it follows: *"All beliefs and modes of behaviour instituted by the collectivity"* (Colbjørnsen, 2014a, p. 20)

In the same paragraph, Colbjørnson renders Durkheim's words and phrases the definition to a more modern context:

(an) institution presupposes a level above the individual which governs or influences social action" " (Colbjørnsen, 2014a, p. 21)

In the context of our research project, this information leads us to the conclusion that universities can be positioned, and at the same time labelled as institutions in society due to their societal role " (Colbjørnsen, 2014a).In other words, the importance an university plays in society is higher than just being a mere firm or organization. In addition to the label of institution in society, it is augmented by the legitimacy universities capture in the society by serving a higher purpose than themselves and giving back to society by educating the future workforce in various fields. This point is enforced by the work of Lynne G. Zucker in

"Organizations as Institutions" in Research in the Sociology of Organizations where it is stated that the organization as a form "serves as the focal defining institution in modern society" (Zucker, 1983, p. 13). The condition is that it must achieve a goal higher than itself as a form or symbol of commitment (Rollag, 2005).

To encapsulate these notions presented so far, the universities situate themselves within an institutional framework granted by their nature of activity given by the purpose they serve in society.

Following this train of thought, it was mentioned in the beginning of this section that the Embedded Digitalization (ED) model was constructed with the idea of following the digitalization processes which take place within an institutional framework (Colbjørnsen, 2014b). In other words, Colbjørnsen recommends that digitalization is to be seen in relation to one facet at a time. In Figure 1 (see Figure 2) it can be seen the graphical representation of the ED model, where digitalization as a process is being “observed through the multi-faceted institutional context” (Colbjørnsen, 2014b).

In the manner dictated by the framework of the model, digitalization within universities is not to be looked upon as an exogenous shock, but it is rather embedded within the provided institutional framework. In effect, digitalization can be studied through the facets employed by Colbjørnsen.

The five facets employed in the Embedded Digitalization model are as follows: industry, organization, technology, market and policy and regulation (see Figure 1). The order in which they have been enumerated is completely aleatory, but it is of relevance to mention that for this specific paper, we will be considering if a certain facet has a higher importance compared to the others. As the context in which this research is done is unique, and the crisis brought down by the COVID-19 pandemic has affected all industries, we will argue later on that Policy and Regulation has a greater importance in affecting digitalization than all the other four facets.

The facets will act as lenses or prisms through which digitalization will be observed in relation to each one of them. Figure 2, as seen in the literature review, represents ED as the analytical framework for the research paper.

In the following subsections we will present the use employed for each facet in our research project and the reason for doing so. We will go through every facet in a randomized order and not by their importance to this project.

5.1. Industry Structure

This facet is about understanding the industry structure, which proves to be important for analysing the educational services industry in which universities are typically categorized (Dalavagas, n.d.). In his doctoral thesis where he analyses the Norwegian book industry, Colbjørnsen takes into account how the actors are interacting with each other, enacting in certain exchanges and looks at the typical supply chain for the aforementioned industry following also the degrees of vertical and horizontal integration (Colbjørnsen, 2014a).

In the case of our research paper, we do not find the relevance of the industry structure as described by Colbjørnsen. In the educational services, industry would have little to do with how it impacted digitalization. We are interested, however, in another aspect of the industry structure. Namely, there is a plethora of actors that can speak on behalf of the industry and that are an important feature of this category. In other words, these actors have a direct and strong impact over the industry facet and determine how the mechanisms work by means of cooperation between them and possibly having an impact on digitalization.

5.2. Organizational structure

The second facet of the ED model introduces the researcher towards how the organizations, in our case Danish universities, chose to perform the tasks that involved digitalization. Applying this perspective over the digitalization will allow us to come to terms with the strategy and methodology adopted by the Danish universities. In other words, we are interested in finding out the departments and people that were responsible for implementing, developing, supporting digitalization, how management was involved and coordinated this process and what structural changes were brought by digitalization.

In terms of changes to the organisational structure, we will be interested in exploring what processes have been digitalized during the pandemic in terms of pedagogical and administrative tasks, and if these changes would have been considered outside the scope of a pandemic.

5.3. Technology

When talking about digitalization, technology certainly is a crucial element in understanding digitalization. What Colbjørsen recommends through the ED model is to make an assessment of the overall available software formats, hardware components and technological options with which the universities might utilize and see the consequences by choosing one over the other.

In the context of our project we are interested in seeing firstly if the Danish universities part of our research have undergone any digitalization processes during the pandemic. Further on, we will focus on how universities adopted and used certain technologies in order to serve the organization's goals during the pandemic, why have they decided to use these specific technologies and how sustainable the changes brought by such choices would be viable after the pandemic.

The last point of this section will be to understand whether or not the digitalization adopted during the pandemic has been forced upon the universities and how has this been experienced.

5.4. Market

The 4th facet of the ED model is the market. What we refer to as a market, in the context of the Danish universities, is not a physical or a specific location within a square where the exchange of goods and services in exchange for a remuneration occurs.

Our understanding of the market is more of the economic system that balances supply and demand, which corresponds to the vision adopted by Colbjørnsen also. In the case of the educational services industry, it can be noticed that there exists a multitude of markets that serve the same thing: knowledge.

We are interested in seeing how the market affected digitalization in the Danish universities and for this we would see how technological changes removed or at least blurred certain geographical boundaries. In addition to this, we will also be looking at how new markets emerge and collide as a result of the low opacity provoked by technology and by the COVID-19 pandemic and what can this entail for the Danish universities.

5.5. Policy & regulation

Policy & regulation has an effect in the role technology and all what it entails (digitalization included) played in society in general. This can be seen in the measures adopted regarding the use and ethics of Artificial Intelligence (AI), the measures the European Union adopted regarding personal data by implementing General Data Protection Regulation (GDPR).

In a normal situation, there are policies, laws and regulation frameworks that apply to any type of organisation, including universities, when adopting digitalization. In our specific case, Policy & Regulation presents as having a higher importance, as the governmental restrictions implemented for controlling the spread of the virus dictated how the remaining facets affected digitalization.

5.6. The pandemic as an exogenous force

Mentioning COVID-19 pandemic as an actor in the institutional framework is important to the paper because, as it has been experienced, the pandemic was an exogenous shock which encompasses all the institutional context and its elements. In normal settings, the elements of the institutional framework are, to a certain degree, predictive and the organizations will adapt in their own manner to the environment.

But when there is an exogenous element that exerts a shock to the system and drives it into a crisis, there is a disruption going in the ordinary environment that the organization has been used to. This results in decisions and strategies that have to be taken to manage the situation but also in new opportunities that arise. As a response, the organization will tend towards regaining stability and this is usually done by rethinking the organization in terms of continuity. This is referred to as *punctuated equilibria* (Ryfe, 2006).

"Institutional orders will reproduce in the absence of a shock to the system. This is sometimes referred to as punctuated equilibrium. Over extended periods of time, we ought to see long periods of relative stability, critical junctures in which the system is shocked and opportunities for new directions arise, followed by the creation of new institutional orders and a corresponding increase in stability" (Ryfe, 2006, p. 138).

COVID-19 pandemic is the exogenous element that shakes the system. It encompasses the institutional framework and affects all the facets at the same time. Its impact on a specific facet can be deemed as more important than the other, but it is the cumulative shock exerted on them that will then infringe upon digitalization.

Following this train of thought, COVID-19 may have changed the way universities look at digitalization and challenged processes they were used to before. Now, COVID-19 acted as the catalyst for what we aim to conceptualize as *"forced digitalization".*

6. Forced Digitalization

Throughout the literature available on digitalization, one main detail is commonly encountered, and that is the fact that digitalization is not just a simple action to be taken, but rather it is a historical process that it is continuous. This entails that anyone interested in employing digital technologies through digitalization in their business or organization will have to start a process of implementing or applying digital technologies.

A process like that will be different from one case to another, but there will be factors that all processes will have in common. In a general approach towards a digitalization process, these factors can be planning, implementation, testing, improving, scaling up, and optimizing to name a few. In turn, these processes require time to be dealt with. But what happens when time is scarce and unexpected events, such as the crisis of the COVID-19 pandemic, affect this process of digitalization?

As researchers, we believe that when uncontrolled and unforeseen external shocks directly affect the time in which the steps mentioned before are taken, it will in turn affect the digitalization process itself. The current literature shows that digitalization process is continuous and requires time for the digitalization projects to be implemented, an external factor such as an unforeseen pandemic striking the world would impede organisations from performing their regular activities and push them towards considering alternatives in order to remain relevant on the market.

The hypothesis we will employ further in this analysis will be the fact that for some universities, the process of implementing, adopting, rolling-out and using digital technologies through digitalization has been *"forced"* upon them. Hence, we come with the proposition of

a new concept, namely that of "forced digitalization", which we will further use in the analysis. As the lockdown had implied both the teachers and students had to remain in their homes while also continuing their activities, the management of the universities had to find a way to make this possible, in a very short period of time.

During the data collection, one of our focuses will be directed on understanding the factors, motivations and decisions made by the inner organisational departments of the universities in terms of the digitalization processes started because of the lockdown. Moreover, this data will be reviewed to reveal whether digitalization was forced upon the universities or not.

7. Methodology

This section will account for choosing the philosophy of science that will be used for the research project, how it will contribute to the project and its symbiosis with the analytical framework.

7.1. Hermeneutics

In this section, we will introduce the philosophy of science adopted for this research project, hermeneutics, and how it can contribute to the methodology of the project. Moreover, we will assess its symbiosis with ED as our analytical framework.

As it was mentioned in the previous section, digitalization is seen as a continuous process. Combining this continuity notion with hermeneutic circles of knowledge, the more we know discover using hermeneutics the more we will understand digitalization. The point that hermeneutics makes is that digitalization is a reiterative process and not a linear one.

In this research project, forced digitalization is the phenomena that as researchers we strive to understand before we can conceptualize it. Hermeneutics is the scientific method that studies the individual understanding and experience of certain phenomena based on a perspective rooted in a specific place and a specific time (Egholm, 2014).

Taking into account the fact that the participants to our data collection process are individuals situated into an institutional context on whose understanding, together with our interpretation of it, will allow us to better understand the forced digitalization phenomena.

Hermeneutics, in Egholm's (2014)perspective, considers the individual to be intentional, meaning that every action has a reason and a purpose behind it.

By using hermeneutics, we employ a realistic ontological starting point for acknowledging the existing knowledge. To elaborate, Egholm (2014) argued that the opinions and meanings exist in an independent manner of us as researchers and our study, and it is of our duty to uncover this knowledge in the pursuit of expanding the understanding of the phenomena.

Rendering the work of Gadamer in Truth and Method (Warheir und Methode, 1986-1990), Egholm indicates that in order to have access to and understand the world, we must do it through our preconceptions and prejudices as they form the basis of interpretation (Egholm, 2014).

Interpretation is the way we generate knowledge and it is the epistemological basis of hermeneutics. With this in mind, this philosophical approach to social sciences will allow us to interpret text and speech in order to unveil hidden meaning.

Since interpretation always takes place in time and location-specific contexts, the meanings and opinions that the individual attributes to phenomena and events are considered to be contextual. This brings forward the contextual perspective in which the focus is on understanding the actor's intentions and motivation in connection to the specific phenomena under study. In other words, we are interested in how the participants individually experienced forced digitalization within their own institutional context.

Following this train of thought, we will employ philosophical hermeneutics from the starting point of the research which will allow us to not bracket out our conceptions. Furthermore, such an approach to hermeneutics will allow our prejudices and for conceptions to facilitate a more comprehensive interpretation of the forced digitalization phenomena by creating a cross-subjective link in order to perceive the interpretation and understanding that occurs between the text/speech and reader/listener (“Hermeneutics”, 2008). This point endorsed also by Egholm (2014) whose argument is that hermeneutics does not see science as value-free.

Is it important to be mentioned that as researchers we will not be holding on to our prejudices and preconceptions, but we openly allow them to be marked in the encounter with

what we call forced digitalization. This aspect of the research is paramount for generating knowledge in the sense that in order to reach a complete understanding of what forced digitalization is and means, there has to be an interplay between the phenomena studied and our perspective. This is the moment when our horizon and the phenomenon's horizon are seeking expression along with each other, and the dialogue which normally occurs in an interview facilitates the understanding. We will achieve what Gadamer called fusion of horizons ("Hermeneutics", 2008).

In relation to our research approach, hermeneutics employs quite well the abductive approach when interpretation is formed by constantly moving back-and-forth between the parts and what it is already known until that point ("Hermeneutics", 2008). These methods employ gradual expansion of knowledge and meaning which in the end will give a general understanding and possible valid embodiment of the studied phenomena.

Hermeneutics takes a top-down approach perspective in our case as we are interested in understanding the intentions of the digitalization specialists in regards to their experience of actions and events.

7.2. Research approach

One of the aims of this project is to increase the understanding of the forced digitalization by adopting perspectives which could potentially develop our comprehension of the theoretical complexity and in the end generate knowledge about the phenomena.

There was the direct empirical observation, whom we as students noticed and experienced, that universities underwent a process of digitalization for which they were probably not prepared to undergo it in such a short period of time. We looked into understanding digitalization and how it was furtherly embedded within the Danish universities through the experiences and knowledge of the people involved in managing and working with this phenomenon. This phenomenon can be considered an anomaly in the educational system and cannot be explained using an established theory (Kovács & Spens, 2005). Taking this into account, this led us towards experiencing learning loops between the empirical data and the development of the existing theory. Such approach is endorsed by Alvesson and Kärreman (2007) where they state that empirical material can be used as a critique and problematize existing frameworks (Alvesson & Kärreman, 2007).

Our abductive process began with us experiencing first hand part of the digitalization that was adopted by Danish universities during the COVID-19 pandemic in 2020, more specifically the online courses. This led us, as researchers, to question the depth to which universities went with digitalization and if it was forced upon them, and due to what reasons. The next step of the process was to research into digitalization and what theories and models are published that would benefit our project regarding forced digitalization. With no evident success, we continued with gathering data by interviewing specialists from different Danish universities, and while viewing the data, we discovered that the ED model would be helpful in analyzing the data. While conducting the coding process, we realized that the model as presented by Terje Colbjørnson in his work from 2014 needed further adaptation to suit our needs. To make sure that our changes and appliance of it were in concordance with the theory around the model, we took the extra step of contacting the author and acquiring his validation on our proposition of considering the pandemic as an external factor influencing the facets. With great success, we continued with analyzing the data that led us towards answering the research question and proposing a reviewed ED model that can be used for further research.

We want to see how this phenomenon is interpreted and experienced in order to create more knowledge and contributes to the social scientific discourse, rather than validating existing knowledge which is also scarce in this area. In addition to this, by taking into account the temporal aspect this is a major issue whose studying is under development, and we are contributing to the development of this area of study. In choosing the abductive approach we took into account the idea of being able to determine which aspects of the studied situation can be generalised and which are specific to the contextual settings. In determining the general and particular features of the situation depends on our previous experience and theoretical knowledge, which we cannot discharge (Kovács & Spens, 2005). This means that we enter the study with a luggage of knowledge reflecting our standpoint as researchers, but it is of paramount importance to emphasize that this did not act as a hurdle in our process of harvesting new insights. As stated before, we were looking for "new" knowledge that could stem from the anomalies and surprises, and not to test propositions and as a result achieve the balance between theory and empirical data. This view is also supported by Kovacs & Spens (2005) who say that:

"Abduction also works through interpreting or re-contextualizing individual phenomena within a contextual framework, and aims to understand something in a new way, from the

perspective of a new conceptual framework. (...) Taking an abductive approach leads to new insight about existing phenomena by examining these from a new perspective." (Kovács & Spens, 2005, p. 138)

By looking at the philosophical stance that we chose, this directs us towards analysing the interpretation of our experts with the objective to unveil how they experienced, understand and worked with digitalization. The insights are then extracted and put in connection with the theory in order to discover plausible explanations of the phenomena and change certain preconceptions we had. This way we open up to and point to plausible directions for developing and rethinking the theory. Such an approach is endorsed by Alvesson & Karreman that mention:

"pay particular attention to the interplay between theory and empirical material, thus focusing on how inconsistencies and breakdowns derived from empirical observation, rather than (pure) theoretical speculation, may help us develop theory" (Alvesson & Kärreman, 2007, p. 1266)

By using abduction, we do not intend to generate a new theory or to test an existing one, but we will be heading towards theory elaboration. What it implies for our study is that we investigate the general theory and empirical context simultaneously, accommodating for both the general and the particular (Ketokivi & Choi, 2014).

7.3. Research Design

From the beginning of the present study, we knew that we will be confronting with a problem that there were no earlier studies that we could refer to as the last pandemic to hit the world was in 1920 and digitalization in those years was still in its incipit phase of invention, television being one of the inventions of those times.

Initially, our interest was stirred by the COVID-19 pandemic and the unique global situation that has brought with it. We knew that we wanted to see the impact it had on what was considered "normal" before that and how organizations adapted to it. And we know that an organization is not alone in its environment but there is a plethora of factors that have an influence over its way of conducting its activity in order to remain relevant in the market. Digitalization was the unused catalyst, and in some cases the missing one, that helped a lot of organizations and businesses across dissimilar industries to strive during the pandemic.

Oriented in this exploratory way, we find it paramount to acquire understanding and insights with the phenomenon of digitalization. Following this train of thought, we found it efficacious to select an industry that has been drastically affected by the pandemic and coerced in a rapid deployment of tools and processes that involve digitalization. Taking into consideration that we had first-hand experience as students on how the pandemic affected the university sector, we were compelled to expand our understanding of this phenomena. Our intention was to inductively generate knowledge about whether or not universities felt that digitalization was forcefully imposed on them and what outcomes derived from it and see how it is being rolled out in an institutional context presented in the Embedded Digitalization model. In other words, there will be constant learning loops that will take us from the empirical context to the general theory and so on.

We knew from our experience as students that a typical Danish university is no stranger to digitalization giving all the technical tools it has at its disposal in conducting physical classes, organizing exams and providing students with software and hardware for their classes. We inferred from this aspect that digitalization already exists in a university and can be seen as a historical process which dictates the next direction, and in turn we argue that it is embedded not only within the university as an organization but also in the institutional context. Danish universities made a quick switch from the formal physical lecturing to online lectures and examinations and this made us curious about how they have managed it in such a short amount of time.

Our attention was directed towards all the higher education institutions in Denmark, not only in Copenhagen. As it is the case of exploratory studies, qualitative data is predominant ("Exploratory Research," 2008) and we invited for an interview representatives of every university in order to get a better understanding of the digitalization processes that happened in each of their universities. The participants were chosen based on their experience and implication with digitalization in their university. The results we gathered from the representatives did not disappoint because we discovered the factors and considerations universities took into account when they digitalized. For most of them, it was a case of either they immediately adopt digitalization or not and the latter meant that they could have been out of the market because they could not perform their primary activity: educating the students.

After this, the coding process was necessary for being able to extract the data that was relevant for our project. We identified the recurring core concepts and themes by closely looking at the transcribed interviews and we laid them out on a table in a table for making it easier to read. Following the coding process we proceeded with the analysis section where we analyse the data in relation to the employed analytical framework which allowed us to look and conceptualize the term of "forced digitalization" and, at the same time, being able to form the grounds to answer the research question. Also, it is in this stage that we built the fact of the revision that the ED model needed in order to fit to our case.

In the next stage, we continued with the discussion where we related digitalization with each facet of the ED model and showed how each of the facets impacted digitalization and thus conceptualizing the term "forced digitalization". Moreover, the discussion provided our proposition for revisiting the ED model which was needed in the context of this thesis.

7.4. Qualitative research

Taking into consideration the research design and approach, we based the project in the qualitative research tradition in order to answer the research question.

As researchers, we acknowledge the fact that quantitative research methods are more appropriate in measuring the data, but qualitative research methods provide us the possibility to characterize, explain and understand the world and contextually examine the studied concept.

Given the choice of the philosophy of science, qualitative research is in direct operational linkage with language because language is one factor that conveys how people experience the world. Therefore, we were very attentive with the language used by the research participants in their description and experience of the phenomena. On the other hand, we paid attention also because using certain language can lead to misinterpretation which can limit a research participant's comprehension of what is being inquired.

This can be critiqued by using a more objective approach, but this would just separate the knowledge into boxes whose only purpose is only to be observed. But since we work with language (i.e.: text and speech), this means that we work with humans and another characteristic of humans is their behaviour which in the interaction with the world cannot be

controlled in the same way experiments are controlled and are possible to be systematically replicated within a laboratory.

This is put really well by Uwe Flick (2009) in his book "An introduction to qualitative research- Fourth Edition Sage" where he renders on Oevermann et al. in their approach to explain differences between qualitative and quantitative data:

“Oevermann et al. (1979, p. 352) for example stated that quantitative methods are only research economic shortcuts of the data generating process, whereas only qualitative methods, particularly the objective hermeneutics Oevermann developed (see Chapter 25), are able to provide the actual scientific explanations of facts" (Flick, 2009, p. 35)

In our research paper we also employed a quantitative notion. In order to have a rigour in our qualitative research by maximal reliability, it is important to have enough to be able to achieve a full and complete understanding of the phenomena. Applying such rigour when talking about humans and when the research is contextual and temporal based. In other words, what knowledge and facts will be produced now may not have such a huge relevancy when the observation will be repeated in the future. In turn, this will allow us to expose patterns in people's subjective meaning of their own experiences.

In our interpretive manner and in connection with the analytical framework, we focus on the meaning that the actors attached to digitalization and whether or not they felt that it was forced upon them.

7.4.1. Primary data

As a source of primary data, we opted to do the necessary research by employing the use of interviews. Since the pandemic was going to affect the amount of positive feedback in terms of participation, we have decided to move forward with making use of two different types of interviewing practices, more specifically semi-structured interviews and email interviews. Both methods are considered to be qualitative data collection methods, based on the findings from Sage Journal (“Data Collection”, 2008) , and while they share some similarities, there are also features that set them apart. Each of the methods will be presented in detail in the following subsections.

7.4.1.1. Interviewing

Interviewing is considered to be a conversational practice: data, knowledge, information is produced through the interaction between an interviewer and the subject, i.e.: interviewee. The process usually is conducted as a one-way dialogue, where the researcher asks the questions and the interviewee is tasked with the role of the respondent, as indicated by Sage Journals ("Interviewing," 2008). This fact acted as further motivation towards selecting this type of data collection, as it gave us the ability to control the narrative. Furthermore, using both semi-structured interviews and email interviews, we were able to keep the discussion only in terms of pandemic and allow it to derail only when it suited our end purpose, which is to abstract the ideas in order to answer the research question.

In most of the cases, researchers chose to audio record and then transcribe the interview. For the research under consideration, the platform employed to assist with the recording and transcription of the interviews held online was *Otter.ai*.

Moreover, there is an advantage of being two researchers conducting the interviews, as it allowed us to compare the notes and the interpretations of the same interview, see where we agreed or disagreed and what concepts or themes we have discovered.

7.4.1.1.1. Semi-structured interviews

A semi-structured interview is a method employed by researchers in different fields, where a series of predetermined but open-ended questions are posed to a group of subjects or interviewees, or as we chose to describe them in this research: specialists.

With the evolution of digital technologies and access to said technologies, the semi-structured interviews can now be carried over video communication platforms, having relatively the same face-to-face feeling. This has also been the method of choice used for this project, as there were limitations on social interactions imposed by the government in Denmark during the COVID-19 pandemic.

As mentioned before, we have chosen this method because we had more control over the topics of the interview and the direction of the discussion than we would have using an unstructured interview (such as the ones used for bibliographies where the researcher starts from one predefined question such as "Where does your story begin?"). In contrast to

structured interviews or questionnaires that use closed questions, there are no fixed responses that are given for each of the questions.

Researchers who employ the use of semi-structured interviews start with the development of a written interview guide beforehand, which can be very specific with carefully worded questions, or it can contain a list of topics and points to be covered. Following that train of thought, we have carefully considered the main questions that we want to ask during the interviews, which came to a grand total of seven question, in order to help us collect the relevant data from our targeted specialists, in order to be able to analyze the effects of a forced digitalization process in terms of a crisis such as the COVID-19 pandemic.

These types of interviews are constrained to a limited and short time frame, which can bring both gains and losses to our research in terms of data. In general, employing this type of research method allows the interviewer to observe non-vocal cues that can further help his research. On the other hand, this type of data can also be misinterpreted and could affect the value of the end result. We are aware of the fact that holding these face-to-face interviews online will present different data in terms of social cues and marks that can be read during the interaction, which is why we have decided not to base any decision or extract any pertinent data from them.

7.4.1.1.2. Email interviews

Compared to the semi-structured interviews, the concept of email interviews is fairly new, having emerged in the late 1990s, as one of the multitudes of online qualitative methods. These types of interviews differ from the regular face-to-face ones through three features: asynchronicity, reduced cues, and anonymity.

Asynchronous communication gives the ability, both to the researcher and the subject, to answer the questions in a time chosen by them instead of the constrained time used in a face-to-face interview. Moreover, the interviewee can choose any setting they prefer to provide the answers to the questions posed in the email interview. These factors have been considered as advantages when selecting the data collection method for this project, as the experts responding to the interviews have also been constrained by the restrictions brought by the pandemic in Denmark in terms of time availability, travel restrictions, and social distancing. By moving forward and deciding to use this data collection method as well as the

semi-structured interviews, we have seen a great increase in the positive responses for the participation in this research.

With email interviewing, the lack of face-to-face (FTF) interactions is referred to as "reduced cues". This comes from the fact that the researcher and the subject do not see or hear each other and the primary method of communication is through text, as mentioned in Sage Journals ("Email Interview," 2008). Again, this has been a strong factor that made us chose this method, as the restrictions in Denmark came with the strong suggestion of limiting the social interactions for everyone's security, and it allowed us to present the interviewees with a method that would not risk an infection or go against the suggestions made by the government.

The last feature that distinguishes semi-structured interviews and email interviews is the anonymity that can be given to the subject, even though that identifying information and details can be subtracted from the recruitment forms, the email address of the interviewee, or the signatures of the email. Based on the research made by Sage Journals, anonymity can raise the willingness to answer the questions truthfully and in detail, but at the same time it can have the opposite effect, providing false data and compromising the research. The contact information for each of the interviewee was collected from the official university website, which raised our confidence in terms of contacting the right person and obtaining relevant data.

As there was no possibility of adapting the questions or having a follow-up question during the interview, we moved on and used follow-up emails where there was the need for clarification or to require more information.

7.4.2. Secondary data

As secondary data, we have made use of different articles and data that was available at the time of conducting the research under discussion. One aspect is important to be noted here and is the fact that this pandemic, in these circumstances, and with the practices that the academical community now have, presents a new phenomenon for researchers as it has not been observed or recorded at this scale with this detail, until now. This means that also all the secondary data we made use of in direct connection with the pandemic was constantly developed and updated as we moved forward with our own research. Following that train of

thought, it is relevant to point out that this information might change by the time the research into COVID-19 has been finalised.

To support our primary data, we have decided to make use of any published information and research done in terms of what restrictions were brought by the pandemic in Denmark, how the government decisions affected the day-to-day business and activities and how these issues have been dealt with by the universities. Moreover, the secondary data will be the one setting the basis of understanding and the use of the concept of digitalization, forced digitalization and how these processes have been impacted by the pandemic. We made use of official communications from the Danish government with the scope of showing the measures imposed and the dates when they were enforced.

7.5. Participants selection

Our research is purposeful, namely to identify the effects that forced digitalization had in Danish universities. In order to collect the necessary data and to enhance our understanding of the phenomenon under study, it is important to identify the most suitable participants, as it is the practice in qualitative research (Sargeant, 2012).

In selecting the participants, we took into account the fact that the answers we were to receive had to be decisive in guiding us to answer the research question. Therefore, one of the prerequisite criteria we adopted for selecting the participants was they had to have experience with some form of digitalization either by working in a department that dealt with digitalization or IT, they were the head of IT and/or Digitalization, or head of innovation and development. Another criteria was based on the fact that since digitalization is a process that is planned at the higher management level (Kazper & Ositadinma, 2020), we looked for people that were having an equivalent C-level management position and above in the universities. We managed to get in contact with Chief Information Officers, vice-directors and pro-rectors.

In qualitative research, the sample size is not predetermined as it is in quantitative research. On the other hand, the number of participants has to be enough in order to provide us with the volume of information required by our study. The data we gathered from 10 interviews led us to observe that there were recurring themes and there was no new information that could direct us towards a new concept. As a result, we concluded that the sample size was representative enough to extract an overall view of the perspectives.

7.6. Interview Guide

Before we proceed, it is important to make clear that when we talk about the interview guide, we refer to the list of questions that have the role to coordinate and lead the conversation towards the studied topic of the interview (Kallio et al., 2016).

According to Kitto et al. (2008) in his work entitled *Quality in qualitative research*, rigorous data collection procedures influence to a high degree the quality and trustworthiness (Kitto et al., 2008) and in the end the results of the research study (Gibbs et al., 2007).

Therefore, as researchers we decided that it is of paramount importance to develop an interview guide that would direct our semi-structured interview in order to account for the rigour of our data. We have based our interview guide on the framework developed by Kallio H., Pietila Anna-Maija and Johnson Martin in their review called *Systematic methodological review: developing a framework for a qualitative semi-structured interview guide* (Kallio et al., 2016).

As a consequence, we have divided the process of developing our own interview guide for the purpose of our study following the 5-phase approach recommended in the study: 1) identify the prerequisites for using semi-structured interviews; 2) retrieving and using previous knowledge; 3) formulating the preliminary semi-structured interview guide; 4) pilot testing the interview guide; 5) presenting the complete semi-structured interview guide (Kallio et al., 2016). A visual representation of the framework applied in developing the interview guide can be seen below (see Figure 3).

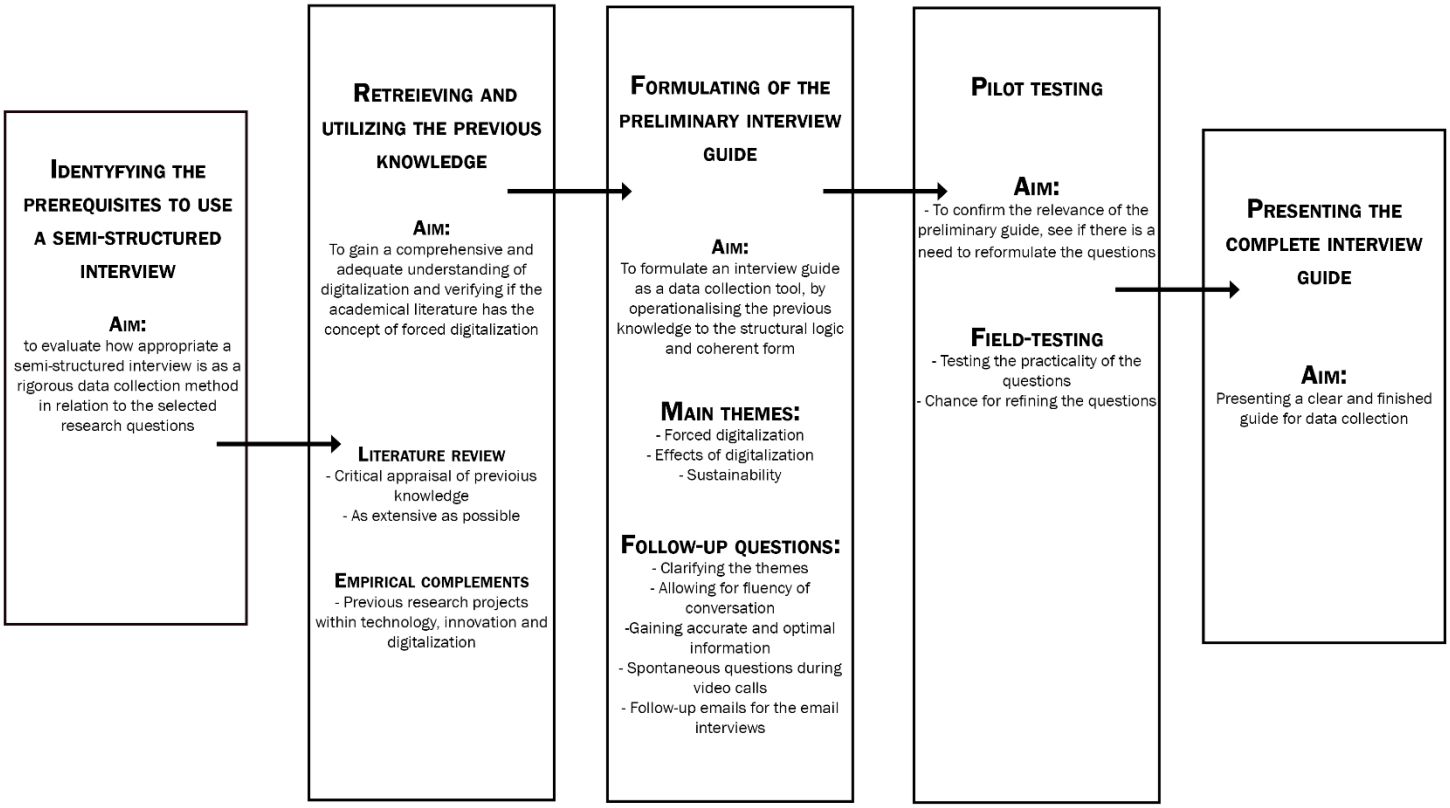

Figure 3- Interview guide

Source: (Kallio et al., 2016)

Since the beginning of the project we knew we wanted to conduct semi-structured interviews and this is because of the nature of the phenomena we are studying. But a more methodological reason for choosing this data collection method over others would be that, in relation to the selected research question, the semi-structured interviews were the appropriate method in capturing participant's perception and opinions on this complex topic.

The second phase of developing the interview guide is based a lot on our previous knowledge and comprehensive understanding of digitalization. Our knowledge is based on the research projects we wrote during our Masters studies and were both within the field of technology and digitalization. On top of this, we complemented the understanding of digitalization by carrying out extensive literature review, part of which has been presented in the literature review section of this project. Digitalization is a very broad concept which we attempted to encompass within the scope of our project and limiting its use to fit our study. we have identified the potential gap between the digitalization and how it behaves as a result of an exogenous shock on the institutional context.

Having chosen the research method and gaining the required knowledge and understanding of digitalization and of the potential gap in the context of the COVID-19 pandemic which formed the conceptual basis for the interview, we could create a preliminary semi-structured interview guide (3) under a structured, logical and coherent form (Kallio et al., 2016).

As researchers, we are aware that the quality of the interview questions affects the data collected.

Giving the flexible and loose form that this data collection method embodies in combination with the research topic, allowed us as researchers to engage in a dialogue with the participants and change the order of the questions based on how the conversation was evolving. Furthermore, such type of interviewing asked for open-ended, well-worded and participant-oriented questions which made it easy to go from question to question and make the conversation flow in a natural manner. Following this train of thought, the interview questions covered the main themes of the study, which were digitalization, how was it perceived and its effects. We look for creating a possible sequential order in the questions allowing for an easy progression in the nature of the events. Moreover, to be sure that no information was being left uncovered and to gain accurate and optimal information, we followed-up with spontaneous questions during the video calls and by email for the email interviews that we conducted.

To pilot test the interview guide (4), Kalio et al. (2016) recommend an array of techniques: internal testing, expert assessment and field-testing. In our case, the best way to pilot taste the interview guide was to do a field-testing, as such that it would eliminate the bias we had towards the questions designed and having it assessed by external specialists was not available to us.

Field-testing implies testing it with the participants we invited for the interview and acquiring crucial information about the implementation of the interview guide. We looked for intelligibility, question relevancy and whether they truly extracted participants' experience and perception.

The last phase culminated with presenting the semi-structured interview in its final form, which can be seen in Appendix 1 (Appendix 1), based on the previous phases that we have walked you through above.

7.7. Data collection

As mentioned above, the interviews were conducted online and for this we used software such as Zoom and Microsoft Teams allowing us to conduct a virtual face to face interview. When we stepped into the digital field for collecting data, our intention was to explore how universities managed digitalization during the COVID-19 pandemic and what were the outcomes that resulted from this digitalization in each organization.

The first semi-structured interview we conducted was relevant for investigating how the interview questions we compiled would be performing in practice. The advantage of adopting semi-structured interviews was that it allowed for a successful reciprocity between us as interviewers and the participant, we could improvise new or follow-up questions based on the responses received from the participant in case his/her responses would not stay in the sphere of our interest (Kallio et al., 2016). We gave the participants the space they needed to express their experiences and understanding of the digitalization that happened in each of their universities during the COVID-19 pandemic. In this situation the advantage of having the video call interviews allowed for the participants to be more willing to participate in our interview. Regarding the attentiveness of the body language and tonality used by the participants, it was impeded by different factors: bad connection which made them repeat themselves, using AR backgrounds in their video calls and positioning the webcam that would not always allow for observing their gestures. Regardless of this, we replied with showing interest in their answers by the use of our tonality and gestures. In other words, we were hearing not only listening, nodding to each of their answers and very importantly, asking for further information when the situation asked for it. On the other hand, the data collected through email interviewing concealed us from such important visual cues, but on the other hand gave the participant the time needed to give a detailed answer to the questions asked.

For the email interviews, we did not have so much control over the conversation but we made follow-ups with the participants where their information given by them was not clear or when we needed extra information as we were going back and forth between the theory and data.

We have found out that the majority of the participants had almost the same experiences during the pandemic, with only a few not being taken by surprise by the measures imposed by the government and the same work practices.

7.8. Data processing

We have conducted a total of ten interviews: six semi-structured interviews and four e-mail interviews. The total duration of the six interviews amounted for over one and a half hours and they were all recorded and transcribed by using the AI-powered software *Otter.AI*. The transcription was not adliteram due to verbal tics and miscues in the participants' speech that would make the transcription harder to understand. Even though we did this, the editing process did not change the meaning of the quotes. The recordings proved to be very helpful in recalling the information collected but in order to ensure the accuracy of the transcriptions, we asked each other for help when it was the case that one of us was not sure of the interview's audio content. The data processed from reports and articles, we sought it to fit in the temporal context and to include terms related to digitalization and digitalization processes. Moreover, we took into account who was the author and the purpose of the report or article. The reports were taken mainly from international journals and other reputable publications that published peer-reviewed papers.

Following the abductive fashion, the knowledge extracted from the data processing will not be used for confirming theory, but for elaborating it. This implies that we approached the processing of data in a grounded way, as supported by Straus and Glasser (Glaser & Strauss, 1967). One of the reasons for adopting this method developed by Strauss and Glasser is that it offers the researchers free choice in the way to handle the data, being systematic but creative at the same time, a point supported by Strauss & Corbin (Strauss & Corbin, 1998) (Strauss & Corbin, 1998).

In the same fashion, we made use of the iterative learning loops when we were collecting data and concurrently highlighted what was out of ordinary or surprising data for us and interpreted it. In turn, we sought to explore a similar direction in the subsequent interviews with the other participants. We decided that the most important thing to consider about the interviews was to extract the participant's conceptions and rationale. We noticed that during the interviews and their analysis, we became conscious of a multitude of words and phrases, which were of particular importance for our research, that have been

subsequently recurring by using the same words or phrase. In this manner, interpreting the data through coding was simultaneous with seeking all the interpretations that might exist. In the course of coding, we did not indulge in a microanalysis of the data by looking at every word and every line as this would have been time consuming and would have led to a level of confusion and getting lost in the data, which in this exploratory study we want to avoid in order to be able to answer the research question. In contrast, we discerned certain key points and narratives that were able to address the research questions and, in this way, secured ourselves against an overload of data, a point shared also by George Allan (2003).

We were aware that while coding the data, multiple codes might emerge during the analyzing process and giving the fact that we are two researchers and each one of us comes with his interpretation of the data and each interpretation brings with it different concepts. The concepts extracted are usually recurring in the data and they represent an abstracted exemplification of the researched phenomena, taking on the explanation given by Goede and Villiers (2003). Taking into account the extraordinary context that our research project is being undergone, we chose to look at the concepts as being contextualized and accurately pinned down. In other words, the concepts extracted from the data we consider them to be bound to when, where and how they happened, by whom where they experienced and other boundaries. Such an approach is endorsed by Strauss and Corbin (1998) in their work regarding coding in qualitative research. This is important to mention that we do not consider that by limiting the concepts to the context they will lose from their abstraction and generalisability, because such an exogenous shock as a pandemic is a rare occurrence and accounting for the quantitative aspect of our qualitative research the concepts can be extended outside the research's participants.

Continuing in the abducting fashion, we sampled and compared the data we processed with the theory in the same fashion that Moghaddam (2006) also suggests. Therefore, we proceed with sampling the data, more precisely looking for events and incidents. This had begun with the interview guide, where the sampling had not been very detailed, and then it evolved and became more concise as the project progressed. We considered what Goulding (1999) called "theoretical sampling", where we took out only the obvious events and statements but there was need for more data to be extracted in order to add veridicity to our findings. After this, they have been sorted into categories and we looked for patterns, themes and narratives that could occur and then looked at new information with the existing

categories and see if there are any further similarities between them. The ultimate goal was to reach "theoretical saturation" as Glaser and Strauss name the point where there is no new information, events, narratives and incidents in regards to any of the categories selected (Glaser & Strauss, 1967). After looking at the developed concepts from the answers provided by the participants, we observed that there is a pattern in their answers and allowed us to categorize these concepts using axial coding by refining and categorizing the recurrent themes and codes. After identifying the core themes through this, the next stage was to be selective about the core themes and present them in a cohesive and meaning-filed theme (Moghaddam, 2006; Williams & Moser, 2019)

7.8.1. Coding

We did not find it relevant to categorize the universities based on their profile (i.e.: technical, business, artistic) because they were all affected by digitalization and this has little to do with their educational profile. Moreover, when conducting the interviews, we were asked by the participants not only to keep them anonymous in our research project, but also to not name the universities they were representing, allowing them a freedom towards the information they would be willing to share. We complied with their request and therefore we anonymized each university in this present research by attributing them an indicative and also leaving out certain organizational names from the interview excerpts that we extracted. Each university was given the indicative "Uni" followed by a letter in alphabetical order i.e.: A, B, C.

The indicatives do not direct towards the name of any university. Having eight universities in our study, with two of them having two participants, we have coded them as such: Uni A, Uni B-1 & Uni-B-2, Uni-C-1 & Uni C-2, Uni-D, Uni-E, Uni-F, Uni-G, and Uni-H.

The information gathered from the interviews was coded in order to suit answering the research question, together with the sub-questions. The categories were created, defined, and allocated data based on the three main concepts that we are approaching in this research: digitalization during pandemic, forced digitalization and the effects of forced digitalization on Danish universities.

Following, we will lay out our coding which we based on the data processing methodology presented before and what each code means. The information was derived from both the themes extracted from the interview questions and from the themes that emerged

while analysing the interviews.

Digitalization

In order to give a relevant start to our analysis, we first must understand if the targeted universities had undergone any type of digitalization during the pandemic. That's why the first category of coding is entitled Digitalization, and the data under will consist mostly of facts and personal opinions of each of the interviewee.

Processes

With this theme, we are aiming to categorise the different types of digitalization processes that were adopted during the pandemic. As a starting point, we considered that the main process adopted was online courses (as we have experienced first-hand), which lead us to believe that it might not be the only process that was adopted. This category will help the analysis by underlining the understanding of digitalization that each interviewee had, and the level of digitalization that took place during the pandemic.

Processes are divided into two core categories: *admin* and *deliverability*. Admin refers to all the administrative processes and the processes that happened in a university that was not visible to the public stakeholders. Deliverability refers to the processes that have been digitalized in connection to the pedagogical aspect of the universities i.e.: conducting classes, sitting exams.

Factors

As we argued earlier in the project, a digitalization process requires extensive planning, and with the pandemic, a big section of that planning was left aside. Under Factors, we are aiming to understand what drove each of the universities analysed to undergo the different digitalization processes. For the analysis, this section will provide pertinent data that will help us underline and strengthen the reasons behind the belief that digitalization is embedded within this industry.

This theme incorporates two other core categories: *technical* and *business* factors. *Technical* factors refer to all considerations that involve technology, both software and hardware, such as: applicability, ease of use and support, cost etc. *Business* factors refer to

the motivations and reasons that made universities undertake digitalization in order to continue their activity.

Forced

This theme follows to understand if the universities felt in any way forced to start these digitalization processes and in which way it was considered forced. This information will help us in the analysis by providing grounds for validating what we consider a new concept, which is forced digitalization. This theme will not solely answer the research question but it is in combination with the whole data that will provide an answer.

Changes

Regarding the changes theme, the data gathered under this section relates to all the changes the digitalization process brought to the universities, in terms of organisation, practices, culture, or day-to-day tasks. As a result, this theme circles to core categories: *organizational* changes and *work practice* changes. The first one refers to the changes that structurally and socially affected the university, while the latter contains the changes that impacted the way the workforce and the way it works.

This information will be pertinent for our analysis, as it will possibly augment the belief that there was forced digitalization, and these changes can be considered the effects of said digitalization, which is one of the main areas of interest in our research.

Collaboration

We chose to name collaboration the theme that encompassed the concepts related to how universities choose to communicate, provide help, coordinate, exchange practices with other actors that are implicated in the high-level education institutions. These can be corporations/ businesses, other universities, political actors, students etc. The role of these collaboration relationships was to better manage the effects of the pandemic but also how to better manage the digitalization processes that each university was going through. In the analysis process, this theme will allow us to have a better glimpse of the educational industry and the markets, which can also affect digitalization to a certain degree.

Sustainability

Regarding the sustainability theme, the concepts grouped under it are related to the measures concerning the digitalization that universities undertook during the pandemic and whether or not the changes implemented will be permanent. Moreover, this category will allow us to see how these changes will shape the way the universities will operate in the future and in relation to the research question, the information gathered from this category will provide substantial insights into how digitalization, forced or not, affected the universities and what were the resulting effects.

Process ownership

With concepts categorized under process ownership, we wanted to uncover who was responsible for planning, deploying, managing and evaluating the digitalization process in each university. It can be that it was a top-down approach where the top-level management took the responsibility for the whole process. In other cases, it might be that only the IT department of the university handled the situation or the university created a special body during the lockdown that took care of the digitalization in that specific university. We are interested in seeing how digitalization affected the inner structure of the universities and what disturbances has this brought.

Organic digitalization

The last theme is of particular interest for the project because it provides us with insights connected to the university's considerations regarding digitalization if there was no pandemic. In other words, whether or not the universities would have taken the measures that they took now and when that would have happened. This aspect poses a paramount addition to the analysis and to answering the research question in defining the forced digitalization in Danish universities and its effects.

			Participants					
			Uni A	Uni B		Uni C		Uni D
				Uni B-1	Uni B-2	Uni C-1	Uni C-2	
CODES	Digitalization		• During	• Both	• During	• Before	• -	• During
	Processes	Admin	• Digital Exhibitions	• E-version documents	• Online Meetings • Remote work	• Staff education	• Meetings	• Facilitating online work
		Delivery	• Upgrade of online teaching	•	• Online Courses	• Teaching	• Teaching • Supervision	• Teaching • Exams
	Factors	Technical	• Training & support	• Compatibility • Relative advantage • Complexity • Affordability • Ease of use	•	• Hardware • Ease of use	• Bandwidth	• Speed
		Business	•	• -	• Ability to continue activities	•	• Employees' technical skills	•
	Forced		• Digitalized the system	•	• Forced to work in a new way	• There was no choice	• No alternative	• Yes
	Changes	Organizational	• Tech adoption • New Support Teams	• Reduced operational costs	•	• Culture changes Digital literacy	• -	• Stability, • security, • finances because of the shortcuts taken during the digitalization process • backlog of work
		Work Practice	•	• Work more agile	• New ways of working together	• Digital & remote work • Acquire new hardware	• Virtual meetings • Less waste	•
	Collaboration		•	•	• Students	• Microsoft • Other universities • Crisis group	• Universities Denmark • Sektorpartnersk ab	• Minister of Education • other universities • IT departments
	Sustainability		• Early to say	• Online group discussion • Teleconferenc ing	• Hybrid teaching • Work from home • Less meetings & travelling	• Focus on non-digital • Digitalization + digital tools as supplement	• Digitalization as supplement • More collaboration • New meeting practices	• Most changes will stay on • Hybrid teaching
	Process ownership		• Top Management, Enthusiastic employees	• Individual units	• The Deans together with the whole organization	• Digital department • Leadership • Rectorate	• Digital department • Beredskabsgru ppe	• Special Committee
	Organic digitalization		• Some changes were already in development	• Accelerated adoption • Challenges the business model	• At a lower size and speed	• At a later stage • Pandemic pushed it	• Not at the level witnessed	• In a distant future

			Participants			
			Uni E (CPH)	Uni F (AU)	Uni G (VIA)	Uni H (CBS)
CODES	Digitalization		• During	• During	• Before	• During
	Processes	Admin	• Communication & Collaboration • Approaching & onboarding new students	• Online work	• Administrative	•
		Delivery	• Switch to online education	• Online classes	• Pedagogical	• Online teaching
	Factors	Technical	•	•	•	• Ease of use • Technical support
		Business	• Ability to continue activities	• Being able to work	•	•
	Forced		• Yes	• It was forced	• No	• Yes
	Changes	Organizational	• Work from home, hybrid teaching, online meetings, • More students attending classes	• Working from home at a higher level	• Optimized support, business development	• No major structural changes, just adoptions
		Work Practice	•	•	•	•
	Collaboration		• Some external collaborations, but changes • Internally with students	• Internally, between departments • Comm with Students	• National board including all university collages	•
	Sustainability		• Yes, especially the working from home	• Yes, high interest to work from home. • Hybrid teaching model	• Yes, but not entirely	• Yes and no
	Process ownership		• Quality Department, IT department	• Taskforce	• VIA leadership	• Senior management
	Organic digitalization		• Would have not considered	• Probably not	• Yes, but would have taken a longer time	• Yes, but not that fast

Table 1- Coding table

8. Analysis

This chapter seeks to analyse the data in relation to the literature presented in the beginning of the project. Our findings were extracted from both primary and secondary data sources collected. Having exposed the coding that will be used for the laying out of the data, we proceed with the intent to analyse the information.

As a consequence of choosing ED as our analytical framework, the data will be categorized under the five facets for the model namely: industry structure, organizational structure, technology, market and policy & regulation. Combining this with the information that emerged from the coding process, it led us towards revising the current model in order to fit the university context which will be touched upon in discussion.

We will analyze the interplay between the data and the theory one facet at a time, for each of the universities. This will provide us with meaningful insights on the digitalization undertaken by Danish universities this year.

8.1. Organizational structure

In terms of organizational structure, there are a couple of areas of interest that were revealed by the coding of the data gathered from the interviews: digitalization process ownership, organizational changes, processes digitalized and the organic digitalization.

In accordance with data gathered through the interviews, the process of planning and implementing digitalization in universities, has been firstly encountered to be a top-down approach, where the management of the universities had the final decision. This data is corroborated in more than one instance, where Uni-H describes it as *"top down from our senior management. They are the ones who took the decisions. And we, at the lower levels have implemented it. So, basically a top down decision, and they have been involved all along with evaluating the pros and cons of taking new steps." (see Appendix 9),* which is furthermore enforced by Uni-A, who states that *"The management team communicated the overall demand for digital (...)" (*Appendix 2*).*

What we observed when we laid out the data in the table, is that there is a transition into the ways of how each university decided to implement and manage further the process of digitalization. Namely, some of the senior levels from the universities we interviewed,

acknowledged that in order to make the best decision for their organisation and implement the right technologies to help them continue their activities, there was a need for closer communication between the leadership and the different departments that have the right expertise in regards to digitalization. This instance was encountered during the interview with Uni C-2, which reported that *"(…) Digital, EAE, Us, the University Leadership and the Rectorate. I do not know the details of the implementation. An 'emergency preparedness organization' (administrative heads from all units) was established before the lockdown and coordinated key processes. And followed up by local management."* (Appendix 4) and Uni-G who corroborated the fact that *"All our leaders are responsible for digitalization within their areas of responsibility. We have a digitalization board that meets on a regular basis. The board discusses the development and oversees the digitalization projects and their progress. The IT department plays a central role in driving the many processes."* (Appendix 8)

Another recurring bit of information that was discovered during the coding of the data, was the two unique cases that decided to establish a special team of experts to deal with the restrictions and the extra requirements brought upon them by the lockdown during the COVID-19 pandemic. The first case of such a team was encountered while interviewing Uni-D, which referred to it as a "special committee" and described the process as following:

"A committee which met three or four times a week, and made the decisions we had to make fast. So it was the top-level management of the university, the deans and Rector and myself for instance as a vice-director." (Appendix 5)

The second case is found in Uni-F, who have built a special "task force" to deal with the plethora of decisions that had to be made in a blink of an eye. *"It goes back to this idea of the task force. I'm not exactly sure who will sit in there but I know that our CIO was sitting there, the deans of education were sitting there."* (Appendix 7)

Besides the three main styles of approaching the decision making when it involves digitalization during an unforeseen crisis such as the COVID-19 pandemic, that we identified in our data so far, there is another point of interest for us as researchers, and that is the involvement of the employees. Whether it was the case of a top-down approach, a collaboration between top management and other departments, or even the creation of a special team, the employees took an important role in implementing, adapting and supporting the use of those new digital technologies required to continue their activities. In this instance,

Uni-A said that *"(…) but the real change has been by enthusiastic employers that have led the way and helped all others." (*Appendix 2*).* Continuing on this idea, Uni-E adds that *"[not only the IT department had a role in implementing the changes] I think all of us actually have a part in that" (*Appendix 6*),* and Uni B-1 supporting it by stating that *"Each unit has proposed helpful digital tools to improve its current work."(*Appendix 3*).*

A peculiar behaviour has been extracted from the interview with one of the participants representing a university. In this specific case, the participant Uni-B-2 said that there was no set structure and "*It was not politically or discussed by some board or others. I mean, that the way to proceed was dealt with by the people in having the responsibility for the education and the teaching activities" (*Appendix 3*)*. Briefly said, there was no support whatsoever from above and the responsibility of delivering their work was put on the shoulders of the employees responsible for teaching, without any form of guidance. The participant completed his statement saying that "*it has not been kind of decided or discussed actually. It was there and it was left for the teachers to decide how to change this course, this teaching activity into something that would work online. We supplied as much resources as possible to the degree that they needed it. It was not a not a steered process" (*Appendix 3*).* To make it clear, the participant mentions that the management level of the university did not impose any rules on what tools to be used, how they are supposed to be used. Rather they were left in *"an open field"* to decide on their own what the teacher found to be most suitable and then get whatever support you could be provided with from the IT department.

As seen so far, in every Danish university there was a different body that assumed a central role when it came to digitalization. In some universities, it was the senior level management that took the handles and directed the process whereas in others it was the IT or the Digital departments that assumed the central role. The latter were the ones responsible for providing the hardware, software, making sure that licenses were ready and sometimes providing guidance for how to use certain tools. A very interesting aspect was that some of the Danish universities created a new body within the organization to handle the digitalization which will be analysed in the following lines.

Furthermore, what this data reveals is the fact that there is no universal method among the educational industry for dealing with an unforeseen event, such as the expansion of a pandemic. Although only four different approaches were found during the interviews, it seems

that each of the university approaches have moved along with choosing the right fit for themselves.

Moving forward, we will be looking at the structural changes at an organisation level, that came to be as a result of the digitalization processes that each of the interviewed universities have undergone during the COVID-19 pandemic, which in the coding table we refer to them as *organisational* changes. The data refers to different areas of the organisation that suffered changes in the way they operate, the way they deliver their value, the way the departments communicate between them and internally, but also in terms of financial and social aspects that contribute to creating an organisation.

One of the main changes encountered over the group of universities interviewed was the deliverability, which mainly encompasses the adoption of online courses and examinations. All the universities interviewed had considered themselves as campus-based universities, using mostly physical methods involving markers and whiteboards, and only using technologies to augment the processes, fact confirmed by Uni-F, in saying: *"I (...) have been talking about, you know, creating a platform for online delivery of courses for many years. And the response has always been, we are a campus-based University."* (Appendix 7) Moreover, the feeling was shared by Uni C-1, reminding that the *"culture, it's to get us in physical contact, groups, and a whole fun foundation of (...) is not based on digital cooperation, or collaboration."* (Appendix 4).

Another noticeable change that was encountered in the data, was the switch from on-site work to remote and online work. Many of the activities the universities have, specifically the ones discovered by us, are designed and prepared to be delivered in person on the university premises and not online, using a video communication software. This case was encountered both for the administrative part of the universities, but also for the pedagogical section, as many of the teachers had to undergo this changes overnight, fact supported by Uni-E by mentioning that *"within three days most of our education and teaching was on Zoom or online"* (Appendix 6), and Uni-F mentioning that *" (...) my colleagues, they were teachers, so they were teaching Monday morning, and the message arrived before lockdown came, I think it was Friday evening and Monday morning they were teaching on Zoom."* (Appendix 7). It is important to point out that this change has been experienced by most universities, and of course each one of them experienced it at different levels, a point on which we will touch upon later on. The exception comes with Uni-H, which goes on by stating that there were "*No*

*changes in organizational structure at all. The same organization, the same support structures. The same teaching. So no (...) structural changes." (*Appendix 9*).* At the same time, we can see that using digital tools is considered normal and it will probably be a long-lasting change, based on the view of Uni-H: "*Now, everybody uses Teams, or at least all the teachers and administrative staff. Now it has just become a normal tool. (...) So, this is an adoption that has gone from, I don't know, 5% to close to 100. (...) And that is sustainable. That won't be rolled back, that's just a new and better way." (*Appendix 9*).*

This exception comes strictly from the analysis of the data collected. We believe that even if Uni-H specified that there have not been any digitalization processes adopted during the pandemic, the reality presents itself otherwise. Based on our view of digitalization processes and the specifics received during the interview, we strongly believe that there has been digitalization done during the pandemic. As an example, initially, Teams has been used only by 5% of the organisation, which comes from the IT department. The fact that this tool was introduced in the administration and the pedagogical areas of the universities makes it a digitalization process. Moreover, the fact that now they are able to offer online courses, and multiple departments switched from meeting face to face on campus to a virtual meeting room online, clearly suggests that the university experienced some digitalization during the pandemic.

Adopting the notion that digitalization is embedded within the institutional context, therefore within the organization as well, we argue that in order to enable digitalization in all its power one does not need to invent something new but rather make use of what is already existing in an innovative manner and unleash the capacity that is underneath. Given the context of the research we conduct, there was a very short amount of time for universities to be able to invent a new platform or other technological solution. Therefore, they had to make use of what is already at hand and scale it up, if possible. In the case of Uni B-2 where it confessed to us that even though they did not invent *"new digitalizations"*, they had digitization processes *"either in pilot production or in in a small scale production, were increased considerably in amount, and in importance during a very short time",* defining this as the *"form of digitalization [that] we have experienced"* (Appendix 3).

Another piece of information that peaked our interest was provided by Uni-E, by bringing up for discussion the fact that outside the pedagogical and administrative changes that took place within their organisation, the methodology of dealing with one of their most

important stakeholders (students) had to also be digitalized. Following this train of thoughts, Uni-E mentioned that "*it's not only us* [teachers and staff working from home] *but also the students that are impacted a lot with this digital situation and also we have to adjust how we approach new students. How can we take care of them, you know, when they start their education, at CPH Business and, and those kinds of things." (*Appendix 6*).*

Considering that these interviews were conducted outside the lockdown period but during the pandemic, the universities had some time to examine how the employed digitalization processes performed. Based on this fact, we were interested in understanding whether or not these changes would have been adopted without the implication of a pandemic, in an organic way towards digitalization. Of high interest was the fact that six out of eight universities confirmed the fact that they would have decided to undergo digitalization processes, but the level of implementing new technologies would have been lower and would have followed the regular methodological way of assimilating these changes. Some examples can be given from Uni B-2, that stated: *"Yes, of course. That's why we were somehow prepared, but not into the size and the speed of introducing it. It has been a discussion for years, how to use e-learning, how to use flipped classrooms, how to use online whatsoever." (*Appendix 3*).*

Within those six universities, there were cases witnessed where the digitalization processes have been started before the pandemic, and for Uni-A the answer for the last question of the interview was *"Some changes were in the implementation phase – so yes." (*Appendix 2*).*

The last two universities had a different opinion about taking these digitalization processes outside a lockdown imposing pandemic. The first one to express this feeling was Uni-F who mentioned that *"(…) Now we are not anymore* [an] *on-campus based university. So, this has dramatically changed. And I think the view of many people." (*Appendix 7*),* with Uni-E coming in second, specifying that they would not have considered digitalization: *"No, actually no.* [The pandemic] *helped a lot* [with digitalization]*." (*Appendix 6*).*

The data gathered under this section displays different changes that were brought to the organisational structure of each university under the pressure exerted by the pandemic, which in turn affected how the digitalization was adopted and affected. Firstly, we saw that in some cases there were special teams organized to deal with the problem at hand, where in

other instances the leadership of the university has taken up extra responsibilities alongside the tasks they would regularly have. We believe that these changes will not last in the future, as once this crisis is dealt with, there would be no need of a task force for digitalization or for the leadership of the university to deal with issues that are related to other departments. With that being said, there will be changes that will last post-pandemic, based on what the results of the interviews have shown, as well as changes that will be dialled down or even discarded.

On one side, there are some universities who admit that selected digitalization processes that were adopted during the pandemic, such as online meetings, online courses, will be kept post-pandemic, as they prove to be effective in providing value. Further adaptation would be required, but the general feeling is that these changes are sustainable in the future and the desire of continuous use is highly visible.

On another note, there are cases where the digitalization processes done during the pandemic are not believed to be sustainable post pandemic. Some of the reasons for this statement comes from the fact that there are universities who still consider themselves to be an on-campus university, delivering value in person and not online; there are universities who admit that having this forced digitalization resulted in them cutting corners, taking shortcuts in order to be able to meet the demand and the deadline. This resulted in over costly decisions, a quick installation that might not have been proper, and for some created the belief that working remotely is not as productive as working on site.

8.2. Market

In this section, we interpret the data that is related to how the market for higher education impacted digitalization in the universities under our study. A very paramount perspective is that of the feeling of being forced to digitalize and how this is connected to the market. To elaborate on this point, the universities are in a market that serves one main thing and that is delivering and providing students with knowledge.

In order to do so, universities had to remain operable during the pandemic and very much also, as we observed in our study, the changes had to be done on a very short notice. Looking at the answers given by one of the participants, Uni C-2, saying that *"there was no choice in the first phase. There was no alternative."* (Appendix 4) among others that have directly and without leaving any trace of doubts that the digitalization they have been through was forced. Uni B-2 points out very clearly how the pandemic influenced the university and

how the university had to undertake digitalization in order to survive and continue its operation: *"Well, there was not much to consider. I mean, either you shut down the education and the possibilities for students to follow their activities, or you use the tools available"* (Appendix 3).

Continuing on that idea, Uni-E strengthens the fact that one of the main reasons to undergo digitalization was to still be able to do their daily routines, when it comes to working in a university: *"the factors are, you know, to still undertake the work that we're doing in our daily life, you know, teaching." (*Appendix 6*).* There is one instance where it was described by Uni-F as being able to either work from home or do not work at all: *"The problem is that there was a moment, especially at the beginning, where there was nothing, right? It was either your work from home, or you don't work." (*Appendix 7*)*

One note can also be made on the fact that a lot of the universities that took part in the interviews, considered of high importance to be the ease of adopting, implementing and using the different technologies implied by the digitalization processes. For Uni C-2, part of the short list of factors that influenced their digitalization processes consists of the people's ability to access the necessary technology: *"The immediate concern was simply technological: hardware, bandwidth, people's ability to access and use platforms." (*Appendix 4*)* The same perspective was also found in the data provided by Uni-H, who mentions that for them *"the factors were basically ease of use and ease of support." (*Appendix 9*).*

While some universities prioritise the ease of use or the ability to deliver their value, we found a case where a university considered that the most important factor in terms of digitalization processes that commenced as a result of the pandemic, is in fact how fast they could go online in order to continue its activity. Uni-D went on to quickly answer the third question of our interview by saying *"Speed, and we had to do it very fast, so in two days we moved from analogue to online teaching and online work." (*Appendix 5*).*

Taking into consideration the fact that we went out on the field, our explorative way of approaching the participants did not take into account this aspect of "competition" in the market, we did not formulate a specific question for this. Even more so, we left ourselves open to interpret the data. Up so far in this section, the analysis shows that there was a level of consciousness amongst the majority of the universities in relation to being able to continue their teaching activity. There was enough data that exhibited their consideration of still being

able to work. In the interpretative way given by hermeneutics, we can now see the fine connections between market and digitalization even though this was not obvious to the participants. This type of connection shows us that without the power the Market exerted over the digitalization done in university, they would have become obsolete in the market. In other words, switching to online teaching has provided them with the support to continue their core activity and stay relevant on the market.

With the Market facet impacting digitalization in Danish universities and forcing them to make this switch to online learning, we can observe how going online has blurred the line between the traditional way of teaching and the e-learning method. Namely, with the advancements in digitalization and information technology it is about the dispute between traditional learning and e-learning and that now, during the pandemic, their previous market boundaries disappeared as the traditional teaching has now moved online. According to Uni C-1 where it says that there might be a shift in the business model that the universities currently have: *"[the] business model is: people* [students] *coming in,* [after] *three years they get a Bachelor,* [after another] *two years they get Masters.* [...] *knowledge is changing so fast. After five years in the university you already have old knowledge"* (Appendix 4). Seemingly, this is the business model that most universities have, including the ones in Denmark. To better illustrate how one of the effects of digitalization was to make previous separate markets collide and new ones emerging, Uni C-1 stated that players from other markets such as Amazon and Apple have begun to build their own universities [1]where they teach young people more actualized knowledge, as can be seen on those company's online sources.

In this section we showed how Market affected digitalization and the effects that resulted from this. We saw that the need for universities to keep their relevance on the market was the main cause of them adopting digitalization and by doing so, they have moved into a new market. Where previously there has been a clear boundary, now there is not much differentiating between them.

[1] https://www.amazon.science/latest-news/machine-learning-course-free-online-from-amazon-machine-learning-university

8.3. Technology

As we mentioned before, this section of the analysis will be used to see and understand how the different universities made use of the technologies available for them to be used in terms of pandemic. Following this train of thoughts, it is of utmost importance to point out the fact that for some universities, the digitalization processes that would help them maintain their activities during a lockdown have been initiated before the start of the pandemic, meaning that to some extent, these universities were prepared for the upcoming crisis. On this note, Uni C-1 mentions the fact that they were prepared two weeks before the start of the lockdown: *"And before 12th of March we were closed. But actually the IT department was already ready two weeks before. Okay. We had to prepare because we knew what would happen if we had the plan." (*Appendix 4*)* And it was not the only university to experience that. For Uni-G, everything proceeded as normal and only in some cases, the digitalization processes were prolonged: *"All our digitalization projects have proceeded as normal, but more of them have been prolonged due to corona." (*Appendix 8*).*

Moreover, in the case of Uni-G, the digitalization experienced by them did not feel forced, since digitalization represents a method to be used in order to further develop the university. When presented with the second question of the interview, the answer given was clear and on point: *"No, not at all. Digitalization is a very important force in developing* [university's name]*, and we have been working with digitalization since 2008. Of course the intensity has risen the last couple of years and I expect it to rise further in the years to come." (*Appendix 8*).*

Not undertaking digitalization processes during the pandemic has only been the case for two of the eight universities approached for this research. The rest of the six universities clearly admitted that the pandemic had brought them to the point where extra digitalization was required in their organization. In the case of Uni C-2, part of the digitalization processes happened over a span of few days, while others were adopted immediately: *"Teaching (and supervision) was digitized within a few days; meetings at all levels (research groups, departments, committees, leadership) were digitalized immediately" (*Appendix 4*).* Continuing on the same idea, Uni B-1 specified that *"our organization implemented a remote working mode during the pandemic period. Physical meetings have been conducted online through online conferencing software" (*Appendix 3*).*

Paramount for this section is to understand that we live in a century where digitalization is the main driver towards the future development of humanity. With that in mind, it is worth mentioning the fact that there is a plethora of digital solutions, be it online communication platforms, applications that can be used both on mobile and computers, virtual reality rooms and many more examples can be given of technological tools that can be used by organisations to create and deliver value. When it comes to universities and their special need for technological solutions in order to combat the issues brought down upon them by a pandemic, the same problem can be encountered: too many choices, as experienced by Uni-H:

"And this was from the central point of view [of the upper-level management]*, not only the IT department, but also our teaching and learning department: the more tools to support the more difficult. So, we also tried early on to limit the number of supported tools. Whereas before the COVID crisis it was sort of like the Wild West. If you were a teacher you could use almost any tool you wanted and you didn't get much support. Now, you can choose between much fewer tools, and on the other hand we had a lot of support in terms of teaching and in terms of technical support." (*Appendix 9*)*

With that being said, it also stirs curiosity the fact that between the eight universities that were part of our research, there were just a handful of digital tools that were chosen for their daily activities. One example can be given from Uni-H, that have experienced the adoption of Microsoft Teams at an unprecedented level: "*We can see (…) just the use of Teams. Before March, Teams were almost only used in the IT department where we had the routine and that was just a normal tool for us. And I remember in March, that I personally had to show some of my colleagues in the leadership of (…) how to use the basic functions in Teams. (…)" (*Appendix 9*);* that also believes in the sustainability of this choice in a future without pandemic: *"(…) we wanted to slowly but surely, convert into using Teams instead of the old fashioned ways of communicating." (*Appendix 9*).*

Another user of Microsoft Teams was found to be Uni-F, who continued on describing not only that they have to adopt this tool, but also that they had to integrate it with other platforms. Not only that, but a lot of the work that had to be carried out by the employees of the universities required them to be physically on site (university campus) to have the possibility of accessing the platforms used for all the administrative and pedagogical tasks.

This led to the need of finding a solution to the on-site physical presence issue, which came under the umbrella of a VPN. (Appendix 7).

Besides Microsoft Teams, the platform that was encountered the most during the interviews was Zoom. Other universities, from the ones that participated, ended up using this software, amongst them being Uni-E, mentioning that *"within three days most of our education and teaching was on Zoom or online" (*Appendix 6*),* and Uni-D, who admitted that *"First of all, the only thing we actually did was to buy licenses for Zoom." (*Appendix 5*).*

When speaking about which technology to adopt, some universities took a more technical approach. In a normal situation, an approach to a change like this one would have been very well documented and certainly the process would have been prolonged but with the regulations in place and being pushed by the needs of the market to continue their activities, universities had to take the short-term objective: continuing the teaching activity. Following this idea, Uni-F said that in order to be able to do their work, they had a technical evaluation of the factors regarding the software platformers and hardware at their disposal but to make sure that they will be online as soon as possible "a lot of the processes were highly simplified" (Appendix 7). A similar approach was found in Uni-D which confessed that such a short-term vision was what it was needed in this case but in the long run it created a backlog that needed to be dealt with: *"I'm trying to tell them that we've made a lot of shortcuts, security, stability, finance, so we did it fast and we did it right. But we did it with a lot of shortcomings, so a lot of work to catch up on afterwards"* (Appendix 5).

Looking closely at the data, we can easily see that technology played an important part in the digitalization within the universities. The impact that it brought with it changed the way universities will work in the future. At the moment of the data collection, the pandemic was still ongoing, the restrictions introduced by the Danish authorities were still standing, and they did not do anything more than to help with a long-term technological adoption. Such a view is also shared by Uni-D saying that giving this new paradigm will definitely have effects in the long run: *"Yes, a lot of the work, for instance, that it's possible to meet online instead of physically, that is a huge revolution, and it will stay on. I'm sure it will stay on the way to work, partly on site, partly off-site." (*Appendix 5*).* On the same note, Uni B-1 acknowledges the hurdles of the pandemic and with the available technology *"some of the changes brought by digitalization will likely be kept in the post-pandemic time, such as the online group discussion software system and teleconferencing substituting for travels." (*Appendix 3*).*

Uni-H, that stated that even though there was no digitalization in the university but rather a rapid adoption of digitalization and technological tools, a future with more online work and teaching is highly likely to happen *"(...) and that is sustainable. That won't be rolled back, that's just a new and better way."* (Appendix 9).

On the other hand, some universities do not share the same thoughts that technology will be used so much after the pandemic will cease to exist. For Uni-B-1, technology will have limits on how much it will be used: *"However, it will not completely replace the physical meetings, since there is more information that can be acquired when people talk face to face, and it is a more effective way to build trust and generate a connection."* (Appendix 3). It is also important to take into account the nature of what that specific university is teaching and how this can be conveyed using online video courses rather than physical ones. From the Uni-G, we hear that *"many of them* [referring to the changes brought by digitalization] *will certainly be sustainable, but we offer professional courses and therefore it is important that our students practice what they have learned during their education. So can't be 100% online."* (Appendix 8).

Technology plays a vital role when it comes to digitalization and we cannot ignore the technological aspect when we talk about digitalization. We have uncovered the reasons why universities choose to proceed with certain platforms and those reasons vary from the ease of use and support, to how fast they could implement the new ways of teaching and communication in order to be able to continue their activity. Moreover, concerning the sustainability of the chosen technologies and how they impacted the way of work it will highly depend on the universities' teaching profile. In other words, it can be that universities have educational profiles that would require students to have access to certain machineries, have access to certain equipment, or require to work in a laboratory and conduct experiments in order to efficiently acquire knowledge. This is a very important consideration that will impact the continuity of the said technologies in different universities. All in all, Technology influenced digitalization by volume and demand.

8.4. Policy & regulation

In terms of policy & regulation and how they affected digitalization, it is important to look at how the Danish authorities chose to tackle the spread of the COVID-19 virus. For

gathering this information, we turned to secondary data that was gathered from official communications given by the Prime Minister of Denmark.

The data that was of interest to our research project is about the lockdown and what has this implied for the Danish universities, with the final ground into how these new rules imposed affected digitalization in our participants.

To map the information chronologically, in order to give an ample perspective on the speed and unexpected decisions that were taken by the Prime Minister of Denmark Mette Frederiksen, we will start from the beginning of March 2020, and go through the data up until the first wave of social openings that started in late April.

From the communications given by the Prime Minister of Denmark, it can be seen that starting with 6rd March 2020, the threat posed by the COVID-19 virus was minimal, as Mette Frederiksen went on carrying her activities without the regular courtesy of shaking hands, and by 11th March 2020, she released a communicate announcing the strict measures that will be imposed to combat the spread of the virus (Statsministeriet, 2020a).

Within that official communication, it was laid out a plan to set the country in a lockdown for two weeks with the hopes of slowing down the spread of the infection. The main points of interest for this research lies in the restrictions brought to universities, and also social gatherings that were directly affecting university activities. Among those points are the following:

- Most of the spread comes from daycares, schools, educational institutions;
- Students to be sent home for two weeks starting Friday the 13th;
- Both private and public employees who do not perform critical tasks, to be sent home and perform work from home for two weeks starting Friday the 13th;

This was the official alarm that started the pandemic and the lockdown, and was also what made the universities aware of how fast they need to act and how serious it is now. On that note, Uni-F informed us that the message regarding the lockdown came on Friday and by monday, they had to be online *(*Appendix 7*),* while Uni C-1 gave the understanding that they had foreseen a potential lockdown and they were actually prepared for it *(*Appendix 4*).*

The hope was that after two weeks, a slow and steady road back to normality could have been taken, but the evolution of the pandemic did not allow that. After the first two weeks of lockdown, the Prime Minister came forth on the 30th of March announcing that the current restrictions will still be in effect for another period of two weeks, leading the lockdown to a period of one month (Statsministeriet, 2020b).

Following the end of the lockdown, the society started to open up slowly, but some of the restrictions were still in place. There was a continuous limitation on the amount of people that can gather in the same time in one place and a constant social distancing requirement, that came in direct conflict with the way universities conduct their activities, as the examinations period was approaching and while a lot of examination was possible online, there were instances where this was not possible. On this note, Uni-H stated that *"instead of having one exam for 600 people, there'll be two exams for two times 300 people. And the pros of that is a bit of distancing. The cons of that is these 300 people won't have the exact same exam at the end of* [the first] *300."* (Appendix 9*).*

This sequence of decisions that has brought the educational institutions in lockdown for four straight weeks meant that both the employees of the university but also the students were forbidden to step on the campus grounds. This fact directly affected the ability of the universities to conduct their activities as normal. Even after the lockdown was lifted, there were still restrictions in terms of how many people can gather at the same time, which led to the need of splitting up the activities that required physical presence on the campus.

The policies inserted had a direct impact on digitalization, not in the sense of changing digitalization or giving it a new shape, but rather it enabled its adoption in all sectors, including the educational sector. More than that, it had an impact on how the use of digital technologies was seen in cases where it was not an obvious choice, although it was embedded in the industry. In the case of the educational industry, this was observed during the interviews with the universities who stated that they would have not considered digitalization in the way that it had happened, if not for the pandemic that forced them into making these changes and adopting digitalization processes.

8.5. Industry structure

As mentioned before, the purpose of this facet in our analysis is to understand the degree at which individual universities collaborate or cooperate in order to overcome different challenges, which in our case was the lockdown imposed by the pandemic. Moreover, we are interested in seeing how the relationships between the actors that are prominent in this industry affected the implementation of digitalization processes and how they, in turn, affected digitalization.

The educational system in general, works on a competitive level, where each university strives to offer the best solution, even if at times there is a degree of collaboration between them. This can also be seen in the interview with Uni-D, where it mentions that after the necessary collaboration, they were back to the race: *"You were forced to work together, and then you did it. So it was in a way an exception. And now we are getting back to the normal way we are fighting instead of working together, it's quite astonishing."* (Appendix 5).

Based on the data gathered during the interviews, it seems that there were different levels of collaboration experienced in each of the cases. Whether it was internally between departments, between the faculty and students, or externally between universities, and other actors. This collaboration and communication can be considered unique, because it is an uncommon practice for universities to collaborate between each other.

One point of interest comes from the interviews with Uni C and Uni-D, where they mention that there was a special collaboration between the universities and representatives of the government, more specifically the Minister of Education. This was described as an active collaboration from both sides, where they had daily meetings to discuss the possibilities they had. Uni-D mentioned that: *"there was a very, very close cooperation with the ministry, as well. Daily meetings to coordinate and to discuss the different subjects. So it was a much closer cooperation than usual."* (Appendix 5), followed by Uni C-2's statement that "*Extensive collaboration both within Universities Denmark association* [Danske Universiteter] *and with our ministry. It is called 'sektorpartnerskab', which has been a governance model used during the crisis. It's still in operation. Collaboration about interpretation of lockdown rules, models of implementation, key data, and associated policies."* (Appendix 4).

As seen in the words of Uni C-2, there was also collaboration between universities, as some of them are part of a collective that aims to develop through working together. This was

also the case for universities that are outside said collective, like Uni-D, who also mentioned that there was collaboration between universities, especially between the IT departments of different universities: *"During the first two weeks of the pandemic, the universities worked very closely together. The IT departments at the universities would work very close together and try to help each other, to support each other." (*Appendix 5*).* In the same way that certain education institutions were part of an organization, there was even an instance where a board for collaboration was set for a specific type of university, mentioned by Uni-G: *"We established a common national Covid crisis board with all university colleges. The team coordinates relevant subjects. IT* [department] *has not established a formal crisis team, but we share our problems and solutions." (*Appendix 8*).*

It can be argued that from many perspectives, students are an important actor in structuring the educational industry, and they have been an important stakeholder when universities underwent the digitalization processes during the pandemic, something that was experienced by Uni-B-2: *"there has not been any real planned and developed training on how to do the teaching using these tools I mean it. It was invented on the fly by the students together with their teacher, and professors. That's my understanding."* (Appendix 3).

In the same explorative manner, the analysis of the industry structure in terms of collaboration between actors provided us with a broad overview of the dynamics between the participants, as representatives of the universities, and other actors. These collaborations have shown us that universities not only collaborated more than usual between themselves, but also that the exchange of information and practices have brought them possible new approaches towards digitalization in each of their universities.

What we have witnessed here is that, in general, the industry structure is a relevant facet for understanding digitalization and its embeddedness, but in our case, there would be room for adaptation. What we could conclude is that the industry structure in the case of the educational system does not have such a strong influence over shaping digitalization processes within the industry. Rather, the duty falls under the mantle of all the stakeholders that are involved with the educational system. As we have discovered during our research, in times of an unforeseen crisis such as the COVID-19 pandemic, there are multiple stakeholders (students, government representatives, businesses) that have a direct influence over digitalization and the adoption of it. Following this train of thoughts, in the following section we will present a different adoption of the ED model, where the facets will be adapted to serve

this type of research, and that could be used to further understand how digitalization processes are embedded within the educational system.

The data analysis section concluded by setting a firm ground for our research into how the COVID-19 pandemic played a tremendous role in shaping each facet, and in turn how these five facets impacted digitalization, within the educational system, as a result of the crisis presented by the COVID-19 pandemic. In the next section, we will be using the findings in the analysis in order to argue for how the ED model can be developed in order to encapsulate the crisis function and show that a facet can be more important in times of crisis when it comes to digitalization. On top of this, we will shape the concept of "forced digitalization".

9. Discussion:

The Embedded Digitalization model provided us with a framework for analysing the data collected and the meanings extracted from them by dividing it in five different facets of the institutional context.

By having digitalization at the core of the model and showing how each facet is influencing and shaping digitalization, provided us the perspective that there are multiple forces, actors and reasons that each facet can uncover. It is important to highlight again the context in which our research is happening: the COVID-19 pandemic that is still ongoing and whose effects are still visible. In the context of the pandemic and of the educational industry, the ED model had to be adapted from what it was originally used for: a framework for understanding the innovation processes in the media industry, specifically the Norwegian book market.

Since there were considerable differences between the industry selected by the author of the model and the educational industry, the facets representing the ED model had to be either adapted or changed in order to properly fit with the selected industry. This required us to adapt each facet in a way to fit the crisis context where we take the exogenous factors, i.e.: COVID-19 pandemic crisis, as a catalyst for the forced digitalization which speeded up the processes and changed practices within the Danish universities.

9.1. Theoretical implications & Findings

9.1.1. Digitalization and organizational structure facet

The first facet approached in our analysis was the organizational structure. This section of the model was mainly used as it was first introduced by Colbjørnson (2014a). Here we looked at who was responsible for the decisions, how much the management of the universities was involved and at the creation of formal structures. What we have discovered here was the fact that in all the universities, the top management and leadership of the university was involved in the process. Moreover, in some of the cases we have revealed that there were multiple persons or departments involved in attending the crisis, being spread throughout the organisation. These aspects are confirmed also by Colbjørnson in his work pertaining to the Norwegian book industry (Colbjørnsen, 2014a).

Furthermore, during the analysis of the data, we have stumbled upon the fact that this information was not sufficient for answering our research question. As a consequence, we adapted the facet and discovered that when studying digitalization in universities, it is paramount to consider the changes that are brought to the organization that affect both the structure and the regular activities. Adding these two considerations to the facet allowed us to discover some clear effects that were brought by the forced digitalization adopted during a pandemic. One of the clearest examples can be found in the operational structure of the organisation, more specifically in the way their value is delivered: moving from on campus teaching to online teaching. The same level of change was brought also by the remote work, expanding it from a practice found, for example in the IT department, to the new method of administering the university. All in all, the information extract to analyse the organizational structure facet.

As described, the specifics of the organizational structure facet were followed to the letter, with the additional points added to better fit with the context. Having developed a better result from using the adapted facet, we propose, for the future use of the ED model to study and understand digitalization within a different industry, that this facet to be considered with these extra points, or even be further complemented according to the industry studied, a process also encouraged by the author (Colbjørnsen, 2014a).

9.1.2. Digitalization and the market facet

The next facet approached in the analysis was the market. We approached this facet in the same manner that Colbjørnson did in his work (2014a). We observed that with enabling digitalization, traditional boundaries in the educational services industry blurred even more. Starting with geographical locations where students could attend online courses instead of on-campus, to questions posed even by our participants about players from other markets moving into the educational industry neglecting language and cultural barriers that were otherwise significant for the separation of those markets. It is important not to forget that there is also the domestic competition between the Danish universities that enticed a different speed of adoption of the digital technologies. Moreover, the fact that the marketplace is filled with different options when it comes to gaining new knowledge, either they are reputable Ivy league universities or tech moguls developing their own teaching methods, can be considered as a helping factor for the pandemic to influence the adoption of digitalization in the universities.

In all fairness, we have found the parameters set by Colbjørnson in his research using the ED model were more than sufficient for getting us closer to answering the research question.

9.1.3. Digitalization and technology

In a discussion about digitalization, Technology plays a vital role though not the decisive one. As Colbjørnson said in his work, digitalization is a far more complex issue (Colbjørnsen, 2014a). Continuing on that train of thought, there are minor differences in the way we chose to apply this facet to our research.

As a main focus for the technology facet, we aimed on understanding how universities had chosen and used the technologies available to them during a time of crisis. As a starting point, we have discovered that universities had a different choice of technology they used in order to digitalize different processes in their organisation. It is crucial to also reveal the fact that in terms of actual technology, the need and focus was made mostly on software rather than hardware.

The interesting point here was that universities applied a different approach on deciding which software to use for the delivery system and the administration side of the

organisation. There were cases where freedom of choice was provided to each individual required to conduct their tasks online, cases where a specific software was recommended, and the most recurring theme were the cases where the choice of software was based on the prior use of the software in that university.

Continuing in the same exploratory manner of the project to answer the research question, we commenced on adapting the technology facet to encompass a wider variety of information that would help us understand how technology affected digitalization in the universities.

This facet allowed us to discover additional digitalization processes besides the online courses and exams. On top of this, all the non-vital personnel that had the ability to work remotely, had to do that, moving most of the meetings from taking place face-to-face in a physical environment to a virtual environment. Taking into account the factors that were considered when undertaking digitalization, the aftermath of digitalizing these processes lead most of the participants to feel that this situation was forced upon them. It is true that the digitalization that occurred during the pandemic was already there. In a normal setting it requires a meticulous approach in order to be implemented and enabled, but the pandemic accelerated the adoption and use of technology. As a result of this sudden adoption, the effects were felt more intensively in a shorter period of time, whereas in a normal context this process would be extended over a long period and such effects would be spread across a long time span diminishing their impact.

This forced adoption of digitalization during the pandemic raised the question of how sustainable can these processes be post-pandemic. Considering the effects described earlier and the experience each university had as a result of speeding the adoption of digitalization, there were both similar and different feelings experienced by the universities. When asked if the processes undertaken during the pandemic would be sustainable, all universities agreed on the fact that the digitalization would have come in a distant future. Some went on and acknowledged the fact that a hybrid style of teaching will stay on, same as working from home, but there were cases where a return to physical teaching is preferred.

Going back and forth between the data and the theory, we came to the conclusion that the technology facet, in our case, is missing some key points that are relevant in answering our research question. These points consist mostly of the digitalization processes that took

place during the pandemic, the factors considered in adopting specific technologies, the sustainability of these changes and most importantly, the forced feeling in adopting digitalization. As these key points helped our research, we are confident that adding this adaptation of the technological facet to the academic literature of ED, will be beneficial for future research.

9.1.4. Digitalization and Policy & Regulations facet

When it comes to the facet focusing on Policy & Regulations, we share the same view as Colbjørnson in his initial use of the ED model for the Norwegian book industry. We see the importance of considering the legal implications when discussing digitalization, so we looked at how the policies and regulations introduced as a result of the pandemic, affected the way Danish universities adopt digitalization in order to continue their operations. Even if the legislation around digitalization is of high importance, in the case of a crisis like the COVID-19 pandemic, the new regulations were far more important, as the universities were forced to close down the physical operations and continue their activities online.

Specific to this research lies the fact that out of the five facets that comprise the ED model, policy & regulation seems to be the facet that has the most impact on digitalization, coming from the fact that if there would have not been a pandemic, these new regulations would not have been in place, therefore universities would not have been forced in adopting digitalization.

9.1.5. Digitalization and Industry facet

The last facet of the ED model, industry structure, presented one of the biggest changes brought to the theory. We have decided to only make use of the collaboration perspective, as we believe the structure of the industry universities are part of, differs from the norwegian book industry studied by Colbjørnson.

We sought to understand how the collaboration between different stakeholders and universities impacted digitalization. The analysis revealed to us the fact that universities have collaborated with governmental bodies, university associations, tech businesses, even with students. This data revealed the fact that as a whole, the collaboration did not affect

digitalization at all, it rather created a cooperative environment to exchange digital work practices.

When analyzing the effects of forced digitalization upon the Danish universities, it became obvious that this facet requires a fair amount of adaptation in order to provide the pertinent data required for the scope of this research. Continuing on that idea, our contribution to the literature stands in reshaping the points of interest that are encompassed into the industry structure. Aside from the collaboration aspect, the suggestion comes to add the stakeholders of that industry as the main point of focus to provide the necessary overview of how industry structure affects digitalization. This aspect is to be revised for industries where the structure of that industry does not allow vertical and horizontal integrations or other points suggested by Colbjørnson (2014a).

9.1.5.1. Our proposition

Colbjørnson proposes that when using the ED model for analytical purposes, there is only one way of approach, and that is to treat the facets equally and not offer more importance to one over the others. In normal conditions, we strongly agree with this concept. But the research on Danish universities during a crisis (COVID-19 pandemic) revealed that there might be another method of applying this model. As observed, the regulations and restrictions imposed during the pandemic were the main cause for the universities to adopt digitalization. Furthermore, we believe that during this crisis, this facet of policy & regulation had the most impact on adopting digitalization, as it forced not only universities, but all the sectors that had any close contact between employees and other stakeholders. These changes in turn affected the other facets of the ED model, which furthermore affected digitalization.

In an untroubled context, each facet affects digitalization and as technology evolves, the market adapts and structures change around digitalization. This in term affects how the policy & regulation is adapted in order to keep up with the advancements. As we find ourselves in a specific context of a crisis, we believe that this normal method of viewing the ED model would not be fully reliable to present the findings. The reason behind this statement lies in the fact that no matter how much the technology would evolve and would change the market and structure of different industries, the restrictions brought on by the crisis will still have a higher importance in application than any changes brought to the legislation surrounding digitalization. In other words, in this crisis situation the Policy & Regulation facet had most of

its impact on the other facets because of the new regulations that were introduced, whereas the established legislation already shaped digitalization.

We believe that such change in dynamics is common in crisis situations, where the intervention of policy & regulation is crucial for keeping the population safe, but it may not span indefinitely. The new legislation, aimed at diminishing the pandemic, was imposed in the beginning of March which prompted every university to change its way of operating. We observed that no changes directly affecting digitalization happened as a result of the new regulations. Furthermore, we believe that with reaching a point of relative stability, this will not be the case anymore and the legislation will be able to catch up with the advancements of technology during the pandemic, having other facets like the technology one affecting policy & regulation.

The way it was conceived by Colbjørnson, the ED model takes five facets to study digitalization within a specific industry. Our take on the application was to apply all the facets at the same time to one university, rather than one facet per university as Colbjørnson applies the model. The reason for approaching this style allowed us to receive an overview of effects of digitalization in each university by studying them through all the facets at the same time in order to find casualties and common grounds between universities, thus being able to generalize our findings.

As a result of our process of adapting the ED model to suit the needs of analyzing forced digitalization in times of crisis, we present the following illustration, where the effect of forced digitalization can be extracted from each of the facet and to properly illustrate the influence a crisis can have over one of the facets, as it was identified in our case, where the Policy & Regulation facet had a higher importance compared to the other four facets, and moreover, the type of crisis experienced in this research has an effect on the other facets as well.

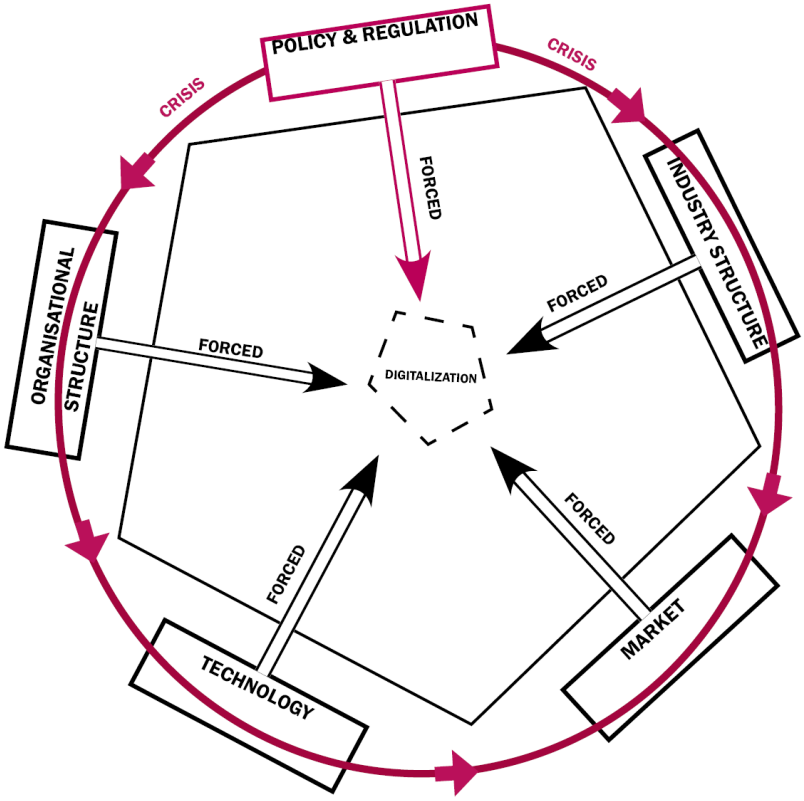

Figure 4- Forced Digitalization

9.2. Limitations of our research

The biggest limitation of our research stands in the fact that all the steps required to complete this project were done during the pandemic. Regardless of this fact, we have decided to pursue this topic of research based on the fact that we had hands-on experience with the effects of digitalization within universities and the academic literature available in situations of crisis like COVID-19 pandemic is in need of completion. Following this train of thought, there were other limitations that came to be during the process.

For the present research, the interest was on discovering the digitalization within the universities. Since the literature on digitalization is in need of updates, the only analytical framework we found that considered digitalization as a focal point was the ED model. There is only one published academic application of the model in the Norwegian book industry. Nevertheless, we took this as a challenge and we developed this model in order to be able to answer our research question.

In terms of data collection, the initial plan was to use only semi-structured interview methods, but the pandemic forced us to diversify and employ email interviews as well. First

issue with this choice was again a result of the pandemic, as the invitations to the interviews were declined invoking the fact that the pandemic brought too many tasks upon them and they would not have time to allocate for an interview. Moreover, being only able to conduct the interviews online denied us the ability to collect extra data from behavioural cues present only when meeting face to face.

The number of interviews collected has proven to be enough to provide us with the information we needed. The initial intention was to have a wider selection of participants from each of the universities targeted, but due to corona and their availability, we found ourselves limited to using one representative from six of the universities and two representatives from the last two universities. What we found out by doing this, was the fact that some of the data coming from different levels of the organisation proved to be conflicting in terms of view or lacked knowledge that the other person from the same university had, as seen in the research. A limitation in the data collection is also the fact that we did not have the luxury of selecting the interviews based on the participants position in the university and their specialisation, in order to group them and compile a more extensive set of data. Rather, we ended up interviewing only the people that replied, even after having attempted several times to contact the others. This led to a group of ten people from eight different universities, that had different positions in the university and a different level of implication with digitalization. Having had the possibility of interviewing representatives from different levels of the universities i.e.: rectors, digitalization specialists, and IT would have led to a more ample set of data that would have led to a more precise result.

On a last note regarding the data collection, the basis of the interviews was set upon the specifications of the semi-structured interview method, which although it allows some freedom during interviews, the aim of the questions is rather specific and in depth. As our intention was to create an overview of how forced digitalization affected the universities, we decided to aim for a more general perspective involving a wider range of factors instead of digging deep into the information. Nevertheless, this approach has proven to suffice our need of data collection in order to be able to adequately answer our research question.

Taking into account the exploratory design of our thesis, it is in this way that our findings can be taken and researched further. Our recommendations for any future research could be to see if forced digitalization can take place outside of a crisis and in that case, it

would be relevant to understand how the model proposed in this paper would work and if the conceptualisation of forced digitalization would be fit for that specific case.

10. Conclusion

This research has focused on the digitalization undergone within the Danish universities in times of crisis, more specifically during the COVID-19 pandemic. The intention was to investigate whether or not the digitalization that the Danish universities went through was forced or not, what were the factors that contributed to this, the changes brought by this digitalization and their sustainability.

This final section of the project will be aimed at rounding up all the pertinent factors that lead to the answering the research question, as seen below:

How did Danish universities perceive the implementation of digitalization to combat the crisis of the 2020 COVID-19 pandemic, and how did the changes brought by this digitalization affected their future practices?

In order to create a better understanding about how the Danish universities were affected by this forced digitalization, we made use of the Embedded Digitalization model which allowed us to view digitalization as an already existing process within the institutional context and not as an external factor that affects the universities. The institutional context as envisioned by Colbjørnson has five facets that acted as lenses through which we looked at how they impacted digitalization and in turn the effects it had upon the Danish universities.

The findings showed different methods through which the Danish universities managed the digitalization, who was responsible for it, how it changed the knowledge delivering market where universities activate and the impact of the stakeholders. Moreover, our findings showed that the Policy & Regulation facet had been the most important facet that affected digitalization. It did not drastically change it, but more how it was enabled and used by the universities.

One of the core themes of our project was to conceptualize the term of *forced digitalization*, representing one of our contributions to the academic literature. In untroubled times, initiating a digitalization project in an organization requires close considerations about

technology, finances, competences, time resources, and the process is stirred by the leadership/ management of that organization. This also entails looking at the rate of adoption and consulting with the employees that resist it.

In the Cambridge Dictionary, the definition of *forced* is when something is done without somebody's will to do so. The most important factor that made this digitalization forced upon the universities was the regulations imposed by the government as measures to contain the spread of the virus. Furthermore, our findings have shown that even though few universities were prepared for this digitalization, many of them felt forced to enable and use it in order to remain competitive in the market. Another factor for the digitalization to be forced is reflected by the fact that they had to choose technologies that were at their disposal and for which they could provide support in combination with the overall low use of these digital tools before the pandemic. This factor proves to be important as the analysis of the data revealed that there were some repercussions for the choices they made (i.e.: backlogs, costly implementations).

The effects of this forced digitalization can be seen at different levels within the universities, and can be identified as the creation of specific bodies with the role to manage the digitalization, the high rate of adopting tech solutions for conducting their administrative tasks, the initiation of more collaborative relations between the universities than it is usually custom, and the most important one is the consideration of adopting a more digitalized way of conducting activities in the future, that have impact on their organisation (i.e.: hybrid teaching, recorded classes, online meetings, remote work).

Since we present forced digitalization to academia as a new concept to be adopted, we find it relevant to create a definition that will encompass our understanding of forced digitalization. The definition of forced digitalization can be considered as following:

Forced digitalization can be understood as the digitalization processes undertaken by an organisation, where the decision was not made organically by the management, but rather pushed towards it by an external factor, such as a crisis.

We consider using the ED model as an analytical framework for our project a pertinent choice that allowed us different perspectives to look at digitalization. However, we sought to develop this theory in order to be able to answer the research question. We did not change the number of facets or the role of the facets, rather we changed the way we looked through

them at the digitalization within the Danish educational sector. Our findings from the analysis and discussion prompted us to believe that, as opposed to what the initial author suggests, there can be at least one facet that has the highest importance in the institutional context and this is possible in a crisis situation like the one we are facing.

An important aspect of using the ED model to look at digitalization with the Danish universities is the context in which digitalization takes place. In an exceptional crisis situation such as a pandemic, the universities took a lot of shortcuts and did many workarounds in a very short period of time in order to survive, but we found from the participants that this cannot be done all the time as there are consequences. There will be backlogs, things that are forgotten and left unfinished, security issues concerning data to name a few.

There is a strong connection between digitalization and leadership within an organization when it comes to implementation and adoption, but our findings showed us that this was not always a steered process. Such a laissez-faire approach led to employees feeling frustrated about it and for IT/ Digital departments doing their best to provide support. In a few cases, there were examples where the leadership took a stance and managed the digitalization and the findings show that in those specific universities there was not a forced digitalization but rather an adoption of the new way to work digitally.

In the end, the digitalization that happened during the pandemic not only changed the present view on how knowledge can be delivered by universities, but it also created a new path on how this process can be innovated in the future. Considering that innovation and digitalization stands at the basis of many of the advancements made today in technology, a remote study option might be seen as the future development of universities that until now offered their practices only on campus.

The ideas exposed in this project can serve as a starting point for managers when considering how the digitalization which is embedded within their organization can be enabled by taking into account the implications of the whole institutional context relevant for the industry they are in.

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Appendix

Appendix 1

Interview questions

1. Since the beginning of the pandemic, has there been any digitalization in the organization? If so, what has been digitalized?
2. What factors did you consider in adopting digitalization? Would you describe it as forced upon your organization?
3. What changes has digitalization brought to your organization?
4. Has there been any collaboration between the universities during covid-19? Or maybe with other actors (i.e.: government, businesses, unions etc.)
5. In your opinion, will the changes brought by digitalization during the pandemic be sustainable post-pandemic?
6. Who was responsible for the digitalization? How has this been organized/ planned?
7. Would you have considered these changes if there was no pandemic?

Appendix 2

In this appendix, the important and interesting quotes from the interview with Uni A are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

- *"We did upgrade the capacity of our digital teaching system"*

Processes

- *"We developed a digital exhibition for our students in design/ architecture"*

Factors

- *"The main challenges in using technology on a larger scale were training and support. So we have organized support teams, particularly in teaching."*

Forced

- *"It has forced the implementation of digitalization of new system much faster in to the organization – "*

Changes

- *"has rapidly raised the learning curve of the whole organization to use available technology."*

Collaboration

-

Sustainability/ Future view

- *"I think it is too early to say. The longer the pandemic lasts – the more the new way be established as the norm/standard."*

Process ownership

- *"The management team communicated the overall demand for digital but the real change has been by enthusiastic employers that have led the way and helped alle others."*

Organic digitalization

- *"Some changes were in the implementation phase – so yes."*

Appendix 3

In this appendix, the important and interesting quotes from the interview with Uni B-1 and Uni B-2 are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Uni B-1

Digitalization

- *"We have also adopted Microsoft Teams for most group discussions and internal document sharing prior to the pandemic situation"*

Processes

- *"Some of the administrative documents are shifted to e-version rather than the print version."*

Factors

- *"We considered compatibility* [in] how *easy the selected digital technology could be assimilated into the organization's current work."*
- *"Second, the relative advantage is also an aspect being discussed within the group. If the new digital method is better and provides more effectiveness and productivity than the traditional method is the focus."*
- *"Third, the complexity of technology is being observed. Since the ease of use by individual colleagues affects the general adoption of digital technology."*
- *"Affordability and trade-offs are part of the consideration before the scale-up of digital technology at the organizational level."*

Forced

-

Changes

- *"Physical meetings have been conducted online through online conferencing software."*
- *"Reduced operational cost in terms of travels and associated carbon emission reduction."*
- *"It also helps improve resource efficiency related to office work. Flexibility in disruption allows us to react faster to the changes and make our work more agile."*
- *"It provides a good reason to challenge our business as usual and leave us no choice but act fast upon the disruption in order to keep the level of performance of the organisation."*

Collaboration

-

Sustainability/ Future view

- *"Some of the changes brought by digitalization will likely be kept in the post-pandemic time, such as the online group discussion software system and teleconferencing substituting for travels"*
- *"it will not completely replace the physical meetings, since there is more information that can be acquired when people talk face to face, and it is a more effective way to build trust and generate a connection."*

Process ownership

- *"Each unit has proposed helpful digital tools to improve its current work."*

Organic digitalization

- *“The fact of the matter is these new digital technologies have been introduced to our work in the organization over the years and the pandemic and lockdown policy just accelerated the adoption of these technologies.”*

Uni B-2

Digitalization

- *"we have not invented new digitalizations as such, I think, I mean. But the ones that we had, either in pilot production or in a small-scale production, were increased considerably in amount, and in importance during a very short time."*
- *"So that's the form of digitalization I would see, we have experienced."*

Processes

-

Factors

- *“Well, there was not much to consider. I mean, either you shut down the education and the possibilities for students to follow their activities, or you use the tools available”*

Forced

- *”The pandemic forced the use of these tools. They forced the students and the teachers, the professors to invent a way of working with it, they've not been trained, there has not been any real planned and developed training on how to do the teaching using these tools.”*

Changes

- *“Definitely a huge increase in the use of digital collaboration tools. It was there, it was used but only a small amount.”*
- *“So that is the major change I would say, how to work together when you are on a task that needs more inputs and it's not your own work only. There had to be developed new ways of working together.”*

Collaboration

- “[the online teaching] *It was invented on the fly by the students together with their teachers, and professors.”*

Sustainability/ Future view

- *"There will be much more work from home, when it is suitable, and many more activities will be with less traveling and less meetings in the physical space, and more in in virtual digital space."*
- *"It will not be 100%. It will be a mixture. And so we will have these hybrid situations where one needs to get used to somebody will be physically together in a meeting or in a teaching situation and someone will attend remotely."*

Process ownership

- *"So it was not that the university said, you have to use this tool, you have to do it that way. I mean, it was an open field where you could decide on your own, what you would find the most suitable and then we try to support it and that went for the teaching."*
- *"The teaching is the responsibility of the deans, we have two Deans but they are responsible for the development of the teaching and how it's carried out, and it's their responsibility to set up discussion groups and so on. To decide how this will develop. It has always been their responsibility and it will be in the future as well."*
- "*it has not been kind of decided or discussed actually. It was there and it was left for the teachers to decide how to change this course, this teaching activity into something that would work online. We supplied as much resources as possible to the degree that they needed it. It was not a not a steered process"*
- "*It was not politically or discussed by some board or others. I mean, that the way to proceed was dealt with by the people in having the responsibility for the education and the teaching activities"*

Organic digitalization

- *"That's why we were somehow prepared, but not to the size and the speed of introducing it. It has been a discussion for years, right how to use e-learning, how to use flipped classrooms. Why don't we make a lot more edgy full internet based applications and so on. But there's never been a real driver for that."*
- *"Nobody had set up the motivation or the finances or any other coach for that, I would say, so that was brought by the pandemic."*

Appendix 4

In this appendix, the important and interesting quotes from the interview with Uni C-1 and Uni C-2 are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Uni C-1

Digitalization

- *"Actually, the IT department was already ready two weeks before. We had to prepare because we knew what will happen we have had the plan"*
- "I discovered that the organization has been created for maintenance of IT, so it was totally operations and not digitalization

Processes

-

Factors

-

Forced

- *“Yes”*

Changes

- *“culture, it's to get us in physical contact, groups, and a whole fun foundation of (…) is not based on digital cooperation, or collaboration.”*
- *“in many cases, so we had to buy some tools, computers, better connection network connection”*
- *“Some teachers started to experiment with different tools, and we could say that their digital literacy became much higher."*

Collaboration

- *"It brought, of course, a kind of curiosity about IT, and also possibilities. It came, and also using IT they find out some things that work better some thing they work worse.”*

Sustainability/ Future view

- *“[the] business model is: people* [students] *coming in,* [after] *three years they get a Bachelor,* [after another] *two years they get Masters.* […] *knowledge is changing so fast. After five years in the university you already have old knowledge”*
- *“you know I can see it already. I can see that the researchers and teachers are asking now for more education and more hypercare in periods where they take new technology in use. So, I think it will continue”*
- *“Our department for Academic After education, they came with some research they said, "the best is face to face". […] We don’t want hybrid.”*

Process ownership

-

Organic digitalization

- *"It will come later to look much more later. The pandemic like pushed everything to us"*

Uni C-2

Digitalization

-

Processes

- *"Teaching (and supervision) was digitized within a few days; meetings at all levels (research groups, departments, committees, leadership) were digitalized immediately."*

Factors

- *"The immediate concern was simply technological: hardware, bandwidth, people's ability to access and use platforms."*

Forced

- *"There was no choice in the first phase. There was no alternative."*

Changes

- *"Most meetings with outside parties are still virtual and most likely will remain so for a very long time. Individual work practices have changed – more working at home; most people have moved away from print copies of papers, etc."*

Collaboration

- *"Extensive collaboration both within Universities Denmark (association) and with our ministry. It is called 'sektorpartnerskab', which has been a governance model used during the crisis. It's still in operation. Collaboration about interpretation of lockdown rules, models of implementation, key data, and associated policies."*

Sustainability/ Future view

- *"There will be more online teaching but in our case we will strive to maintain a strong non-virtual component. Digitization is seen as a supplement. Meeting practices will change as suggested above."*

- *"More coordination between Danish universities."*

Process ownership

- *"An 'emergency preparedness organization' (administrative heads from all units) was established before the lockdown and coordinated key processes. And followed up by local management"*

Organic digitalization\

- *"We have focused on virtual learning technologies in teaching, as a supplement, over several years. But not the dramatic transformation that we have witnessed."*

Appendix 5

In this appendix, the important and interesting quotes from the interview with Uni-D are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

- *"I'm trying to tell them that we've made a lot of shortcuts, security, stability, finance, so we did it fast and we did it right. But we did it with a lot of shortcomings, so a lot of work to catch up on afterwards"*

Processes

- *"Well, it accelerated what you just mentioned about online courses and online meetings and work from home and so on and so forth. It has certainly accelerated the way of working for the students as well as for the administrative staff and the faculty."*
- *"First of all, the only thing we actually did was to buy licences for Zoom."*

Factors

- *"Speed, and we had to do it very fast, so in two days we moved from analogue to online teaching and online work."*

Forced

-

Changes

- *"And we have been very busy, to make sure that we have the capacity to support these new phenomenons, so we have expanded our infrastructure, we have expanded the licencing of works but that's just enlarging what we had."*
- *"It has accelerated or renewed the way to thinking about digitalization, so I think that we have, so to speak, over the window for new discussions and new ways of thinking."*
- *"So there is some minor, minor difference between pre pandemic and after pandemic in the way we are working with the projects and then IT projects."*

Collaboration

- **"***During the first two weeks of the pandemic, the universities worked very closely together. The IT departments at the universities would work very close together and try to help each other, to support each other."*
- *"there was a very, very close cooperation with the ministry, as well. Daily meetings to coordinate and to discuss the different subjects. So it was a much closer cooperation than usual."*
- *"You were forced to work together, and then you did it. So it was in a way an exception. And now we are getting back to the normal way we are fighting instead of working together, it's quite astonishing."*

Sustainability/ Future view

- *Yes, a lot of the work, for instance, that it's possible to meet online instead of physically, that is a huge revolution, and it will stay on. I'm sure it will stay on the way to work, partly on site, partly off-site."*

Process ownership

- *"We have a forum IT Working Group. And we try to connect them to make the right decisions, but in the most hectic phase it was Rector was head of a committee which met three or four times a week, and made the decisions we had to make fast."*

Organic digitalization

- *"It would have taken me years and years. Yeah, we would have considered the changes, radical changes."*
- *"Okay, so it was forced or accelerated by the pandemic, but we should have done it anyway."*

Appendix 6

In this appendix, the important and interesting quotes from the interview with Uni-E are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

Processes

- *"within three days most of our education and teaching was on Zoom or online"*

Factors

- *"the factors are, you know, to still undertake the work that we're doing in our daily life, you know, teaching."*

Forced

-

Changes

- "*it's not only us* [working from home] *but also the students that are impacted a lot with this digital situation and also we have to adjust how we approach new students. How can we take care of them, you know, when they start their education, at CPH Business and, and those kinds of things."*

Collaboration

-

Sustainability

- *"No, actually no.* [The pandemic] *helped a lot* [with digitalization]*."*

Process ownership

- *"[not only the IT department had a role in implementing the changes] I think all of us actually have a part in that"*

Organic digitalization

-

Appendix 7

In this appendix, the important and interesting quotes from the interview with Uni-F are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

- *"the message arrived from before the lockdown came, I think it was Friday evening and Monday morning they were teaching on Zoom."*

Processes

- *"(...) my colleagues, they were teachers, so they were teaching Monday morning, and the message arrived before lockdown came, I think it was Friday evening and Monday morning they were teaching on Zoom."*
- *"Monday afternoon, they were doing expenses registration, using the VPN, blah blah blah. So, there was no alternative."*
- *"So in this way I think a lot of the processes were highly simplified. And they followed a very technical approach in terms of factors on the technical factors, how many licenses, how many bandwidth and so on and so forth, more than the usual very social oriented implementations."*

Factors

- *"The problem is that there was a moment, especially at the beginning, where there was nothing, right? It was either your work from home, or you don't work."*

Forced

-

Changes

- *I (...) have been talking about, you know, creating a platform for online delivery of courses for many years. And the response has always been, we are a campus-based University."*
- *"(...) Now we are not anymore on campus-based University. So, this has dramatically changed. And I think the view of many people."*

Collaboration

-

Sustainability

-

Process ownership

- *"It goes back to this idea of the task force. I'm not exactly sure who will sit in there but I know that our CIO was sitting there, the deans of education were sitting there."*

Organic digitalization

-

Appendix 8

In this appendix, the important and interesting quotes from the interview with Uni-G are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

- *"All our digitalization projects have proceeded as normal, but more of them have been prolonged due to corona."*

Processes

-

Factors

-

Forced

- *"No, not at all. Digitalization is a very important force in developing* [university's name]*, and we have been working with digitalization since 2008. Of course, the intensity has risen the last couple of years and I expect it to rise further in the years to come."*

Changes

-

Collaboration

- *"We established a common national covid crisis board with all university colleges. The team coordinates relevant subjects. IT [*department] *has not established a formal crisis team, but we share our problems and solutions."*

Sustainability

- **"***Many of them* [referring to the changes brought by digitalization] *will certainly be sustainable, but we offer professional courses and therefore it is important that our students practice what they have learned during their education. So can't be 100% online."*
-

Process ownership

- *"All our leaders are responsible for digitalization within their areas of responsibility. We have a digitalization board that meets on a regular basis. The board discusses the development and oversees the digitalization projects and their progress. The IT department plays a central role in driving the many processes."*

Organic digitalization

-

Appendix 9

In this appendix, the important and interesting quotes from the interview with Uni-H are transcribed and put into a suiting category. The quotes are transcribed to extract the meaning of what the interviewee said as we understood it.

Digitalization

- *"And this was from the central point of view* [of the upper-level management]*, not only the IT department, but also our teaching and learning department: the more tools to support the more difficult. So, we also tried early on to limit the number of supported tools. Whereas before the COVID crisis it was sort of like the Wild West. If you were a teacher you could use almost any tool you wanted and you didn't get much support. Now, you can choose between much fewer tools, and on the other hand we had a lot of support in terms of teaching and in terms of technical support."*

Processes

- And I remember in March, that I personally had to show some of my colleagues in the leadership of CBS how to use the basic functions in Teams. Now, everybody uses

Teams, or at least all the teachers and administrative staff. Now it's just become a normal tool. So that has helped the adoption much quicker than if we hadn't had this crisis, and we wanted to slowly but surely, convert into using Teams instead of the old fashioned ways of communicating."

Factors

- *"the factors were basically ease of use and ease of support."*

Forced

- *"instead of having one exam for 600 people, there'll be two exams for two times 300 people. And the pros of that is a bit of distancing. The cons of that is these 300 people won't have the exact same exam at the end of* [the first] *300."*

Changes

- "*No changes in organizational structure at all. The same organization, the same support structures. The same teaching. So no (...) structural changes."*
- "*We can see (...) just the use of Teams. Before March, Teams were almost only used in the IT department where we had the routine and that was just a normal tool for us. And I remember in March, that I personally had to show some of my colleagues in the leadership of (...) how to use the basic functions in Teams. (...)"*

Collaboration

-

Sustainability

- "*Now, everybody uses Teams, or at least all the teachers and administrative staff. Now it has just become a normal tool. (...) So, this is an adoption that has gone from, I don't know, 5% to close to 100. (...) And that is sustainable. That won't be rolled back, that's just a new and better way."*
- *"(...) we wanted to slowly but surely, convert into using Teams instead of the old fashioned ways of communicating."*

Process ownership

- *"top down from our senior management. They are the ones who took the decisions. And we, at the lower levels have implemented it. So, basically a top down decision, and they have been involved all along with evaluating the pros and cons of taking new steps."*

Organic digitalization