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THEATERS AND THE DIGITALIZATION OF THE ORGANIZATION

AN EXPLORATORY RESEARCH INTO THE ATTITUDE AND READINESS TO DIGITALIZATION IN THE FRAME OF CREATIVE WORK

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Abstract:

Digital tools allow humans to interact with each other through technology, in ways that could have never been thought of. Hence, this new way of data production, collection, management and sharing has created a dependence on digital technologies, as humans cannot compete with the speed and capacity of computers. In fact, information has become one of the most valuable assets of modern businesses and they require effective solutions that allow them to efficiently manage and communicate that information and knowledge, which has been retrieved from the vast amount of data collected through their various business processes. For this reason, Information Technologies (ITs) and Information Systems (IS) are high in the agenda of successful organizations. An uncountable number of researches have been carried out on this topic. And several models have been developed in order to help businesses and corporations improve and succeed on their digitalization journey. However, it has been noticed that little research has been done on this matter in the scope of creative work. Relatively few works have been found in relation to theaters and the digitalization of the organization. Whereas, countless studies have been executed on the digitalization of performances. This thesis' purpose is to objectively study the position that theaters have towards the digitalization of the organization, and the research will be conducted through a deep examination of previous researches on this topic and through a careful analysis of empirical evidence, which has been collected through rigorously chosen data collection methods. In fact, the empirical evidence has been gathered from the direct source; that is, by surveying and interviewing theater employees. Some of the concluding statements are that theater employees do not perceive their industry is positioned in the forefront of digitalization; yet, most of them are supporters of digitalization. Most theaters are already using IS, but they are not making the most effective use of it, thus, the research also aims to present few suggestions to overcome the challenges (e.g. that theaters must dispatch the idea of isolating IS and IT governance to solely the people using those tools and that they should put the user in the center of the matrix). Additionally, no correlation has been found between being in support of digitalization and variables such as employees' age or theater's size. Consequently, even though this research does not present a formal statement nor official conclusion on a hypothesis, mostly because its many limitations, the empirical study of theaters' position towards the digitalization of the organization combined with the application of the literature review has provided a considerable canvas for interpretation and has led to a series of new formal assumptions (which are now based on evidence) to be taken into further research. For example, in future researches the situation of theaters in different countries could be contrasted and compared, or the opinions of actors and technicians studied.

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1 INTRODUCTION

Technological developments of the last decades have brought a new transformation of society, with a new understanding of economics and culture (Castells, 2000). In fact, digitalization is revealing "*the World in new varieties and forms*" (Fors, 2010). And this new way of understanding social interactions and business processes alters our previously set conceptions about how the World works (Fors, 2010).

This thesis aims to explore how those changes are affecting the management of digital information of businesses and their organizations, in the context of theaters, to discover how theaters are dealing with the digitalization of the organization, in regards of communication of information (i.e. how they use IS). On the one hand, it aims to research how digitalization is altering production planning processes, such as creation, storage and management of information. On the other hand, to analyze digitalization's effect on work-related relationships, as it is the communication of information. On this matter endless amount of studies have been conducted throughout the years. However, those studies have mainly been directed for ordinary businesses or specific industries. But what about creative industries, what about theater? How are theaters dealing with the digitalization of the organization?

Thus, the purpose of this thesis is to study the aforementioned matters and develop a baseline for theaters derived from a collection of best practices. The motivation for this topic has been the realization of a gap in the literature review on this matter (i.e. no studies were found on how theaters are implementing information systems and digital technologies in order to plan their productions and manage all that information). Therefore, the approach of this thesis turned out to be quite novel and unprecedented, and so, it is important to understand that the aim of the research is to provide a generalized framework, where key issues have been identified to be taken into further research.

As a starting point, it is important to define the term "digitalization". For this research, the definition of Brennen and Kreiss (2016) is suitable, who define digitalization as the form in which an increasing number of fields and disciplines are being remodeled around digital communication and media infrastructures (i.e. an augmenting use of digital technologies for daily activities).

In the context of theater, there is a difference between "digital performances" and "digitalization of theater" that should be noted. The former addresses the dissemination of shows to the public (i.e. communication to audiences) and the latter is involved in creation processes with the use of computers and digital networks. One of the biases for this project could have been the analysis and comparison of these two terms. However, it must be clarified that, in this case, the whole focus of the research is on the "digitalization of theater" (i.e. on the production planning process) (European Theater Convention, 2018).

Accordingly, qualitative data has been collected through a combination of data collection methodologies, which will be introduced in later chapters, to provide reliable conclusions according to the stablished theoretical framework. Next, the addressed research questions of this study will be introduced, as well as the structure that will follow after this introductory chapter.

1.1 Research questions

The overall aim of the research is to analyze how theaters are dealing with the processes of digitalization of the organization, in regards to data management and communication. But in order to be able to address that matter in an organized and explicit way, the overall goal has been operationalized into several research questions, which will provide focused and individualized themes to ease the data collection and later analysis. The research questions to which this thesis aims to give answer to are the following:

RQ1 – How are theaters dealing with digitalization?

RQ2 – Do theaters need to digitize their planning process? Do they feel the need?

RQ3 – Why are theaters not in the forefront of digitalization?

RQ4 – What are the challenges theaters face when it comes to digitalization?

RQ5 – How can theaters benefit from digitalization?

RQ6 – What do theaters need from digitalization? (i.e. why they need it)

Despite being a long list of research questions, these are all framed to the same scope and have a clear goal. Thus, to determine a conclusion for each seemed feasible. Indeed, it has been, as the ending chapter will show. As it has been said, the overall goal of the thesis and, therefore, these research questions, is derived from a perceived gap in the literature review on the topic. And to fulfill that purpose with reliable data, those questions needed to be answered by professionals. The process for achieving relevant conclusions, will be carried through a combination of information gathered from a broad research on previous literature review and a tailored survey for this thesis. Additionally, interviews to theater professionals have been conducted after the survey, in order to contrast the information and get deeper insights. A more detailed explanation on the thesis' structure will be presented in the next section.

1.2 Structure

The structure of this thesis is divided into nine different chapters: (1) Introduction, (2) Digitalization of the organization, (3) Digitalization in creative industries, (4) Digitalization in theaters, (5) Methodology, (6) Data analysis and evaluation, (7) Discussion, (8) Conclusions and (9) References. Each chapter having its relevant subchapters.

Introductory chapter aside, the next three chapters are what conforms the literature review and sets the framework for the conducted research. As it will be argued, it is important to understand certain key terms and to make clear the scope and context of the study. Therefore, the structure of the literature review will be presented as a funnel. It will start with a prelude of broader terms, such as Information Technology (IT) governance and previous researches made in the field of communication of information through Information Systems (IS), and then start narrowing down to more particular issues. IT and IS terms will be presented independently because IT governance is a broader term in

which IS are included; thus, as it has been said, the aim is to move from the broader scope to the specifics.

Then, the literature moves on to the digitalization in the frame of creative work (e.g. cinema, architecture, advertising and design). The aim in this chapter is to compare how different industries that are not necessarily linked to entertainment, but that involve creative processes are facing digitalization. This is to evidence the different relationships with the technology that divergent creative disciplines have – some exist because of it and others are influenced by it. Then, the literature gets to the specific evolution and current situation in theaters and their attitude towards organizational digitalization. It is in this part of the funnel where the perceived gap in the literature is introduced, which is the topic the research aims to address.

Next chapters explain the data collection methodologies applied and the data analysis. It is important to note that the literature review and the empirical research will be kept as independent sources up until this point. But once it gets to the discussion chapter, after the data analysis, both sources will be combined in order to give answer to the aforementioned research questions. Finally, the overall conclusions and suggestions for future research will be presented, based on the discussion chapter.

2 DIGITALIZATION OF THE ORGANIZATION

As it has been defined in the introduction, this first chapter aims to introduce background knowledge of multiple topics related to the digitalization of organization in terms of information communication and information management. These topics are considering Information Technology (IT) governance and Information Systems (IS). The goal is to stablish a framework for the rest of the work and to describe key terms in order to reach enough knowledge to get into the context of the research. Therefore, this chapter focuses on presenting what previous researches on this topic say about how to organize IT within an organization and how several researchers have developed business models to put the theory into practice. The challenges and strengths of IT governance and IS will also be addressed.

2.1 IT governance

Nowadays, information technology (IT) is high on the agenda of most organizations. Moreover, IT governance has become a crucial day-to-day practice when it comes to sustain and grow a business' strategy and goals. The ubiquitous and all-pervading IT has created a need for a specific focus on technologies of communication and management of information. (De Haes and Van Grembergen, 2009).

Furthermore, new ITs are modifying the essence of traditional business strategies as organizations set up new digital options to invest in future opportunities while digitizing their whole corporation. For example, boundaries such as distance, time, space and function are being conquered on account of the use of digital resources. As a result, the new business processes executing digitalized strategies are increasingly growing dependent on IT (Coltman et al., 2015).

Additionally, organization's digital information is in a constant increase and this abundance requires a careful control, so as to exploit it in the most advantageous way possible (Kien Sia, Soh & Weill, 2016). Thus, based on IT, information systems (IS) have been developed to be used by individuals and organizations in order to efficiently manage the growing amount of information (Oates, 2006) – IS will be addressed in more detail later in this chapter. In fact, organizations usually have multiple layers, and IT governance is located in many of them, if not all. IT governance can be found across strategical levels, managerial levels and operational levels (Van Grembergen et al., 2003). However, there is an explicit distinction to be done between IT management and IT governance.

On the one hand, as Peterson (2004, p. 42) states, IT governance "*specifies the structure and processes through which the organization's IT objectives are set, and the means of attaining those objectives and monitoring performance*". Thus, IT governance is a broad process focused on meeting the present and future goals of the business. Nevertheless, which might be a possible reason for some companies (such as theaters) to struggle with the IT governance implementation, is that the stablished guidelines may not be suitable nor work for every industry. On the other hand, IT management is understood as a more focused process, which is mainly present in operational levels and, thereby, responsible of the internal administration of present IT operations, which translates into efficient use of IT services and products (De Haes and Van Grembergen, 2009).

But who is responsible of the success of IT governance and IT management? While IT is unquestionably an issue linked to the Chief Information Officer (CIO), it is not a task limited to him or her and yet, too often business managers withdraw from their responsibilities towards IT governance. Moreover, many researchers have reached the same conclusion; executive positions must be responsible and accountable of IT and CIOs cannot be hold as the unique stakeholders of IT governance (Peterson, 2004).

What is more, a prevailing mistake for organization's failure on succeeding in the development of technological progression resides in the mistake of over focusing on stablishing new technologies. Whereas, instead, the focus should be put in the investment of organizational competences. Classic examples as a result of a deficient approach to IT governance and a lack of change in the organization's mindset are inefficient systems (e.g. ERP and CRM systems) and deficient or unsatisfactory use of knowledge management systems. Hence, companies must build solid business culture and core in order to promote and achieve change (Kane et al., 2015). This issue will be addressed in following chapters, because it is indeed a challenge met by theaters.

Another key aspect resulted from previous research, is the fact that organizations that want to excel in information management and communication must overcome the myth that IT governance is solely responsibility of the CIO (Weill and Ross, 2004). Moreover, many researchers have worked on pinpointing top-performing practices from businesses that have succeeded in implementing IT governance (Kane et al., 2015; Weill and Ross, 2004; De Haes and Van Grembergen, 2009). As those studies have shown, higher profits are achieved when IT is integrated to support the company's strategy. In other words, the most value from IT is retrieved when managers (1) take a critical role when defining IT processes and actively encourage people in IT, (2) determine who contributes to IT decisions and (3) assure compliance with the general goal and values of the business (Weill and Ross, 2004). This is an important aspect to keep in mind for this research and it will be an essential practice taken into consideration for discussion in later chapters as well.

In their research on the best practices of IT governance implementation, De Haes and Van Grembergen (2009) explore and interpret important existing literature in the field. They analyze multiple theories and models and based on that exploratory study they present a list of the top-ten most important IT governance practices.

On the one hand, it needs to be mentioned that their study was derived from the theory of Business/IT alignment, which will be introduced in the next section. The alignment theory has been well documented since the 70's and it has many strong supporters, such as Henderson and Venkatraman with their Strategic Alignment Model (SAM) (1992). On the other hand, despite the fact that De Haes and Van Grembergen's (2009) research focus is on analyzing the financial services sector of Belgium, the found results can be referenced to Luftman and Brier's (1999) study, where they represented more than 500 companies in 15 different industries.

Thus, De Haes and Van Grembergen (2009) concluded that among the top ten most important IT governance practices were the IT investment evaluation by the executive managers, the creation of a committee integrated by the CIO and the executive level managers, the proper management of the company's portfolio, the careful control and report of IT budget, the creation of an IT strategy committee which directly reports to the board of directors, strategic planning of information systems (IS), forming an IT project

steering committee, the CIO reporting directly to the CEO and last but not least, project governance as well as a proper management of the stablished methodologies.

In conclusion, it can be said that there were simpler times when the technology had less involvement and, therefore, the management was less complicated. However, times change and businesses must evolve accordingly. The role of IT has changed from a tactical tool to strategical one and for this reason organizations must adopt this new IT governance approach (Coltman et al., 2015). Next, some IT and business alignment models will be presented. This is because the IT and business alignment theory has been considered to be a suitable guideline to consider for the topic of this research – as it will be noticed, in later sections this theory and the core idea of the models will be referenced multiple times.

2.1.1 Business/IT alignment models

In this section, as it has been previously mentioned, the theory of Business/IT alignment will be introduced in more detail. Additionally, in order to achieve a greater understanding of what this theory entails, three models will be referenced. Despite the fact of being a theory introduced back in the 20th century, there is still great interest in continuing the research regarding the alignment between business and IT and most recent researches maintain the evidence of positive outcomes with the application of this theory (Coltman et al., 2015).

The first model to be introduced has been retrieved from Peterson's (2004) research on the integration strategies and tactics for information technology governance. Nevertheless, the graphic of such model, presented in Figure 1., was acquired from one of his own previous researches in 1998. The model aims to represent the two dimensions of IT governance and its alignments within the business. The first one (i.e. the red triangle) reflects the primary stakeholders when it comes to IT governance, which are the corporate executives, IT managers and business managers. The diamond shape in the background represents the secondary dimension, committed to sustain and optimize IT business value. In this secondary dimension shareholders, IT vendors, suppliers and customers can be found. This IT/Business alignment model clearly highlights the fact that IT governance is not isolated to CIO's responsibilities and that there are, indeed, many more parties involved. Essentially, "*IT Governance relies on the capability of business executives at all levels to set the strategic business — including IT — agenda, understand the business capabilities — not the technicalities — of IT, and monitor business value appropriation from IT*" (Peterson, 2004, p.45).

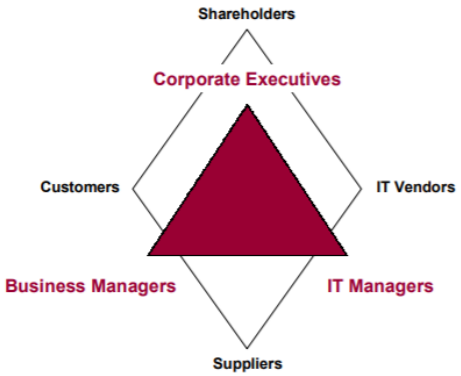

Figure 1: Primary and Secondary Stakeholders in IT Governance (Peterson, 2004, p.42)

The proposal of such models for strategic alignment has been a common practice over time as a manner to supply the managers with pragmatic and functional directions to achieve the right alignment (Sabherwal et al., 2001). There is an indefinite number of barriers that can interfere on the way for companies to reach digital maturity. One of the most easily noticeable restrains is the lack of strategy. Executive managers need to promote and communicate a strong digital strategy to the entire organization, for synchronizing every person, IT system and digital resource involved (Mithas and Lucas, 2010).

The second model (Figure 2.) is a framework proposed by Weill and Ross (2004) created to visualize the link between board executives and IT governance. The top half of the model represents the relationships between the board members. One of these members is the senior executive team, which is responsible for establishing strategies that satisfy the board's commands. The lower half of the framework aims to distinguish the main six key assets from which the business value is generated and the set strategies are achieved. These assets are human assets (e.g. people, skills, training), financial assets (e.g. cash, investments), physical assets (e.g. buildings, equipment), IP assets (intellectual property, services, products), information and IT assets (e.g. digitized data, information, knowledge) and relationship assets (e.g. relationships within and out the enterprise, competitors). The governance of these key means is accomplished both independently and collectively through methodologies formulated by senior board members.

The bottom boxes show the mechanisms that are utilized to govern each of the aforementioned assets. In spite of some mechanisms being unique for specific assets, other methodologies are applied commonly across multiple assets. The core of this framework is to demonstrate how organizations with common mechanisms used across multiple assets attain deeper and better integrations, coordination and communication, resulting in an increase of value.

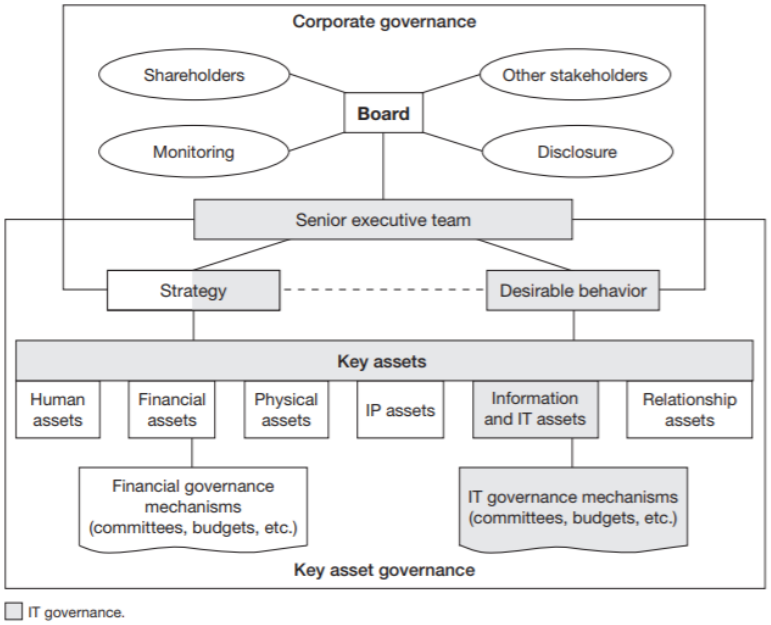

Figure 2: Corporate and Key Asset Governance (Weill and Ross, 2004, p.5)

The last model that will be presented in this section has also been developed by Weill and Ross (2005). Nevertheless, this last framework (see Figure 3) has a more pragmatic approach, since it is a matrixed approach to design the IT governance archetype of a business. The value retrieved from and the need for IT is defined by the daily choices made by the personnel. Consequently, Weill and Ross (2005) created a single-page framework that can help organizations to appoint and distribute the IT decision rights and responsibilities in a manner that those result aligned with the settled business strategy and objectives.

The matrix they present places together five IT decision domains (IT principles, IT architecture, IT infrastructure strategies, business application needs and IT investment), horizontally placed, against five archetypal approaches (business monarchy, IT monarchy, federal, IT duopoly, feudal). This way, companies can easily visualize where main IT decisions are made and easily modify, analyze and communicate those decisions (Weill and Ross, 2005).

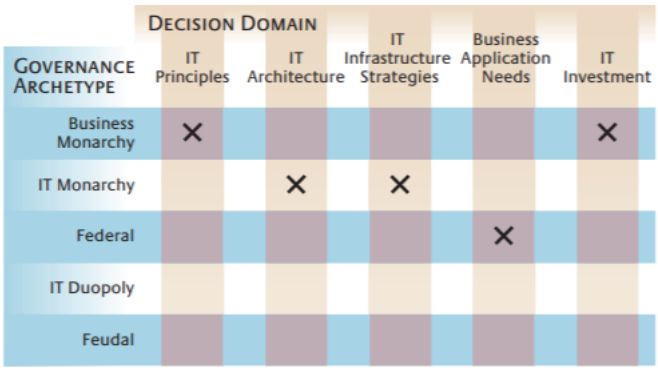

Figure 3:A matrixed approach to designing IT governance (Weill and Ross, 2005, p.31)

Additionally, they (Weill and Ross, 2005) also provide a worksheet (see Figure 4) addressed to companies for calculating an estimated score for evaluating how their business is performing on IT governance. The result will be based on the points given within a scale from 1 (not important/successful) to 5 (very important/successful), and the achieved score will be between 0 to 100.

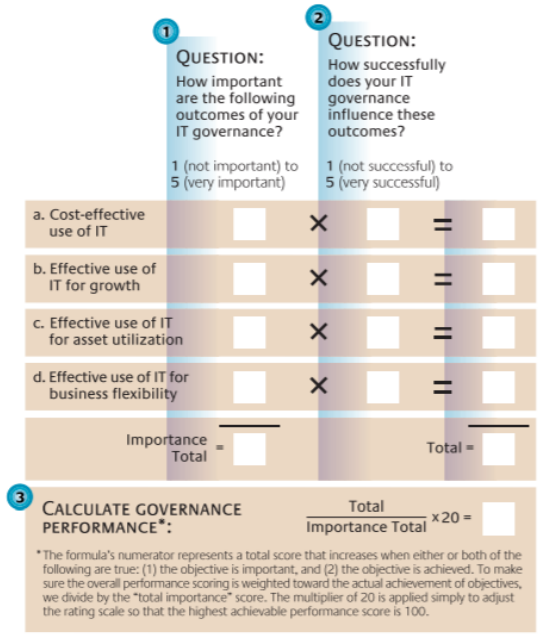

Figure 4: Assessing IT Governance Performance (Weill and Ross, 2005, p.29)

To sum up, what has been learnt in this section in order to later extrapolate and apply into theater's situation, and what the Business/IT alignment theory sustains, is that there is no unique strategy or combination of activities that will accomplish and maintain a strategic alignment all on its own. The theory supports the idea of strategic alignment as a continuous process. In fact, new ITs are constantly altering businesses and the strategies change rapidly. Therefore, executive managers, together with CIOs and several board members should work towards a mutual collaboration that aligns business strategy and goals with IT functionalities in order to increase value (Luftman and Brier, 1999).

2.2 Communication of knowledge and information: Information Systems

After having addressed the overall idea of IT governance, its best practices and highlighted several models on how to efficiently manage IT, the general scope of the thesis has been framed. Hence, in this next section, the focus is set in the tools with which companies can achieve successful communication of knowledge and information. At this point it is important to remember that the goal of the research is to discover how theaters are dealing with the digitalization of the organization, in the scope of communication of information (i.e. how they use IS). Therefore, it is necessary to slightly narrow down the previous section, so that the set perspective fits the context of theaters, which is the focus of the thesis.

The importance of technology when managing information, is increasing over time. Moreover, in business context, the relevance of effective use of technology for the successful management of information, has been recognized for many years (Eisenberg, et al., 2004). Indeed, information retrieval is a key activity in expanding digital environments. However, as time goes by, information is being created in an insane speed and so it does its storage. Thus, with the start of digitalization and further technological developments, information retrieval systems were created. It is thanks to those systems that people can access relevant information faster, as they can browse a database in a velocity that humans could never reach (Dinet, 2014).

Nevertheless, the term "information" has been interpreted in many different ways and perhaps the huge importance and implication of information is the reason for this term to have countless definitions (Bates, 2010a). Anyway, the definition to be introduced in this thesis is one with a broad understanding of the sense of the term. Thus, information can be understood as follows: it is the impressions that the interaction with the environment leaves in people at any instance – those impressions impacting the knowledge, either actively or passively. That is, a person might accept, reject or ignore the information retrieved from these interactions (Bates, 2010b).

However, there is a concern in information studies when it comes to drawing a line between the terms "data", "information" and "knowledge" and their limits (Cornelius, 2002). On the one hand, data is often described as individual pieces of information, that when combined with other pieces of data or set in a context, can gain meaning (Bélanger, Van Slyke, 2012). The data is the easiest to differentiate amongst those three terms, since it is tangible, storable and easily transmitted (Van Bommel, 2004).

On the other hand, the line between "information" and "knowledge" is harder to draw. Bélanger, Van Slyke (2012) define information as the relevant output achieved through the combination of data (i.e. the meaning obtained out of it), while knowledge is described as the process of interpreting that information and making use of it for future actions or decisions. The mayor difference with knowledge is the fact it is tacit, thus, not easily storable or transmittable (Dalkir, 2010). It is the approach of data becoming information, through a process of communication, to finally developing into knowledge (Cornelius, 2002) that is the focus of discussion for this section and one of the important factors that have set the basis for the later research, as it has been previously stated.

Nowadays, technology is considerably more significant and important in matters of managing and sharing information. Organizations want to invest in information systems (IS) with the goal to improve information management and, eventually, successfully achieving business' goals. Moreover, the use of technology is almost inescapable due to the fact that it is present in almost any workplace (Petter, et al., 2012). Hence, what is the mission of information systems? Petter et al. (2012) quoted Keen (1987), who described it as:

> *"The effective design, delivery, use and impact of information technologies in organizations and society. The term "effective" seems key. Surely the IS community is explicitly concerned with improving the craft of design and the practice of management in the widest sense of both those terms. Similarly, it looks at information technologies in their context of real people in real organizations in a real society (p. 3)."* (Petter, et al., 2012, p. 2).

In short, a successful IS means the "effective" creation, distribution and use of information with the use of technology. On the one hand, the evaluation of IS success is difficult due to its infinite possibilities, since its context, use, users and the impact of IT has changed dramatically over time – and keeps changing. Yet, on the other hand, the measurement, at its core, stays rather simple. This is because the key attributes taken into account to measure success (e.g. information quality, system quality, usage and results) remain consistent (Petter, et al., 2012).

The biggest challenge that organizations face now regarding the successful and effective application of IS is to lose track of the basics and, instead, focus too much on the evolving sophistication of IT. Notice the connection of facts, as this issue was indeed addressed in the previous section by different researchers as well. On this matter, Porter and Millar (1985) state that IS can bring a great deal of competitive advantages, and for this very reason business managers should keep their attention in IS and measure their right use and the achievement of the set goals. Henningsson and Kettinger (2006) also support that idea and highly advice to integrate only what needs to be integrated, nothing more, to avoid unwanted costs and decrease of value.

To conclude this section, some examples of the competitive advantages that IS can bring to a business are given; (1) better connection for better data gathering (e.g. systems that connect companies with their suppliers for keeping better track of their orders, or connecting with their customers to improve the service and the control of their orders), (2) elimination of boundaries – geographical locations don not matter anymore (e.g. employees can work remotely from their homes or while travelling), (3) greater control of the organization's activities resulting in the development of more suitable strategies (e.g. with the evaluation of the data collected in the IS, managers can be motivated to change or maintain their current business strategy, to achieve more favorable results (Porter and Millar, 1985).

Bear in mind that those advices and benefits will be used for comparison with the collected data in the discussion chapter, as well as the models that will be presented next. Thus, once again, these theories are developing the foundation for the later conducted research.

2.2.1 Information System success models

This section considers theories and models of information systems with a strong focus on information sharing and communication. The first framework to be introduced will be an IS alignment research model presented by Tai et al. (2018). Next, a theory from Petter et al. (2012) will be presented, also in support of IS alignment. Finally, the D&M IS Success model (Delone and McLean, 2003) will reinforce the idea of communication within information systems.

The following model, shown in Figure 5, was introduced by Tai, Wang and Yeh (2018) with the goal of exploring a better implementation of IT/Business alignment, a concept introduced in the previous section of this paper. Thus, their framework presents a link between IT-Business alignment and IS alignment. This theory supports the idea of a two-way alignment through "*reciprocal planning participation*" – that is how they introduce the idea of ambidexterity (Tai, et al., 2018, p. 1)

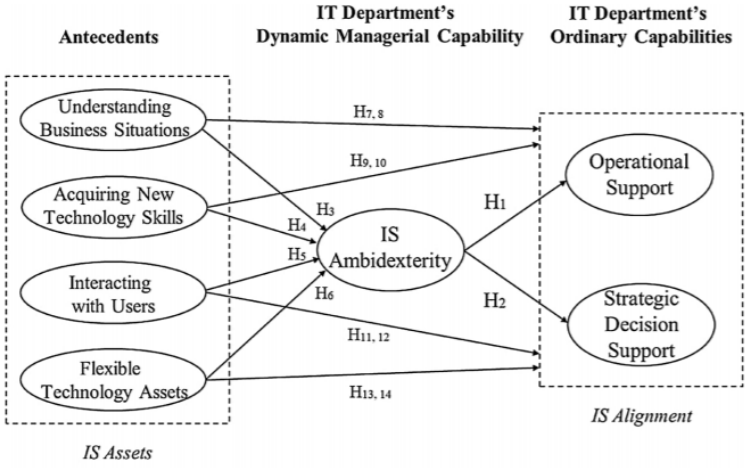

Figure 5:IS alignment research model (Tai, et al., 2018, p. 3)

According to their model, IT department's dynamic managerial capacity, supported by IS assets' mining, symbolizes IS ambidexterity. Additionally, the framework conceives the idea of IS alignment through the coordination of two capabilities: operational support and strategic decision support. The first capacity refers to the support that information systems provide in order to achieve business goals and operational effectiveness by accomplishing competent analysis, coordination and execution of business operations. The second construct reflects the alignment of information systems with the strategic position of the business and its goals (e.g. through the support to strategic decisions, planning…) (Tai, et al., 2018).

The second theory, despite not presenting a graphical model, is also sharing the same core idea as the previous model. In this case, Petter et al. (2012) suggest that the thought of the users, developers and managers being the only key roles involved with information systems should be discarded. In their opinion, other stakeholders should be considered as well, such as: customers, employees, suppliers, etc. That is, for IS to bring value to the business every party involved should be taken into account and not only consider the strategic impacts, but the social ones too (Petter et al., 2012).

Moreover, they make a suggestion for future research on IS, since the purpose, context and repercussion of IT has changed over time and they see proper understanding of this evolution essential for the future. Thus, they call for the development of an IS model that moves on from a personal level to a global level, this way reflecting the reality of information system's broad impact (Petter et al., 2012). Their model's idea meets with the previously introduced models of Peterson (2004) and Weill and Ross (2004), which will be used for the later discussion.

The last model is an IS framework developed by Delone and McLean (2003). The model was named D&M IS Success Model and it is an updated version (see Figure 6) of the first D&M IS Success Model created in 1992. The fundamental principle of the framework resides in the influence that both the communication and information among the parties involved in IS management has over IS success. Accordingly, they conceive IS as a communication technology that produces information (Delone and McLean, 2003).

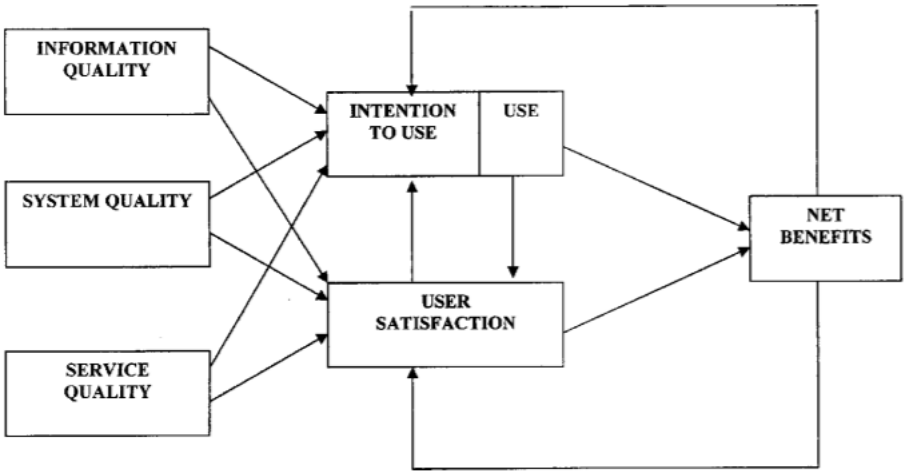

Figure 6: Updated D&M IS Success Model (Delone and McLean, 2003, p.16)

To comprehend Delone and McLean's (2003) D&M IS Success Model, we need to understand, first, that the six dimensions they present are interrelated and not independent. Second, the effectiveness of an IS will be measured by the effect that the information has on the receiver. Hence, the model suggests that when an IS is first created it contains various features that can be classified as "system quality", "service quality" and "information quality" and which must be evaluated separately to avoid the jointly consequent effect on use and user's satisfaction. In the next step, the users will experience those features and that practice will result in either a positive or negative experience. The major change they applied here is the understanding of the "use" factor. A broader approach is suggested, taking into account how aspects such as voluntary or compulsory use may affect the resulting user experience. Thus, the "use/intention to use" precedes user satisfaction. Finally, that usage and the retrieved information quality will have first a repercussion on an individual level, which will eventually result in an overall organizational impact (i.e. a "net benefit"). Hence, when the "net benefit" is positive, the use of the IS will be continued (Delone and McLean, 2003).

To sum up, it can be affirmed that in order to properly understand the value that IS provide and to effectively manage IS's performance, as well as take on the right investments, it is crucial to analyze, measure and evaluate information systems' success and effectiveness (Delone and McLean, 2003). Besides, it is important to remember that IS shouldn't be isolated to just the people using them, but the whole ecosystem should be taken into account. Thus, general managers must be educated into ICTs, to understand when to call IT (Henningsson and Kettinger, 2006).

2.3 Critics to information and communication technologies

After the previous introduction on IT and IS and reviewing the value they can bring to the organizations and businesses, this section aims to briefly establish an additional attribute to the established framework, for criticizing the idealism of the ICT and acknowledging the dangers what too much "*techno-euphoria*" (Treré and Barranquero,

2013, p.27) can entail. The purpose of this is to acknowledge the dangers, so that organizations, by being aware of these, are able to fulfill more suitable and safe digital practices. As Carroll and Rosson (2003) point out, it is challenging to focus on the advantages without also addressing the problems.

As it has been stated before, new technologies have brought many benefits to the society, such as more efficient communication, better and easier access to information, and clearer and less fragmented information. Moreover, Internet plays a key role in the development of new technology and its usage. Nonetheless, it is important to recognize and bear in mind that in the last years there has been an upturn of the critics towards the risks of new technologies, for example: excessive control and surveillance, security issues (e.g. data protection) and invasion of privacy (Treré and Barranquero, 2013).

Porter and Millar (1985) also agreed that while ICTs can help improve businesses and develop industries, they have the power as well of making those less attractive, or even demolish them. This, for example, is an issue perceived by some theater employees, as they are afraid that technology will change theater's core. Indeed, not only theater employees, but any person may be afraid of digitalization and, for example, get the feeling that the biggest businesses, communication organizations or governments are controlling the information we get and spying on us, using our data for their own profit (Porter and Millar, 1985).

Ethics is another matter of discussion when it comes to the use of information systems and information technologies. Despite the fact that most ethical issues associated with information and communication technologies are just adaptations of our traditional moral scenery, it is true that the control and application of those gets more challenging in the technological scope (Tavani, 2011). Different policies are applied to software and hardware, which causes favorable and unfavorable consequences (Carroll and Rosson, 2003).

Additionally, the globalization achieved due to technologies breaking boundaries of space and time has provoked an emerging appeal to knowledge achievement that has led to an increase of the volume of information (Akpotu, 2013). Furthermore, information has become one of the most – if not the most – valuable resources, replacing traditional economical values (Aparici Marino, 2000). However, it is of great importance knowing the difference between quality of information and quantity of information (Treré and Barranquero, 2013).

This issue of quality vs. quantity of information can be referred to the idealization of technology. In other words, in technologically-oriented organizations, the importance of the features of technology (e.g. popularized state-of-the-art software or hardware) gets exaggerated to the point that it overcomes the actual value that the technology brings. In this manner, the organization's goals and needs get ignored and businesses fail to achieve their desired goals (Feldman, 1989). For example, some organizations invest in certain IS only because it looks trendy and because other popular organizations promote its use, without previously carefully evaluating whether it is actually the most suitable tool for their specific needs and goals. This is one of the most common errors that organizations fail to avoid, and for this reason it will be addressed in later chapters too.

To finish with this section, it is important to understand that the technological mythification is a critical reflection regarding ICTs and their effects on communication of information. People and organizations cannot get blindfolded by the digital revolution and its utopian message that technology will solve each and every problem. We must remember the downsides, in order to get the most value of digitalization and manage it effectively (Almiron and Jarque, 2008). In addition, Treré and Barranquero (2013, p.40) present the term of "*historical amnesia*" to reflect on the fact that every technological movement goes through a set of similar stages. For example, they easily differentiate between three stages: (1) the first stage is where the new technology is created and the utopian (or dystopian) speeches emerge, (2) next stage is where empirical research starts to vanish the idealized believes and utopian hopes (or dystopian fears), and (3) in the last stage this new technology is not seen as an innovation inspiring great hopes and dreams anymore, but just as an ordinary tool used in everyday life. Yet, we always seem to forget about it and believe that every new technology is going to end all of our worries (Treré and Barranquero, 2013).

3 DIGITALIZATION IN CREATIVE INDUSTRIES

Digitalization has presented many interesting developments and challenges to most industries (Towse, R. 2011), however, this chapter will only focus on creative industries, such as cinema, architecture, advertising or design, and how these are dealing with the use and implementation of new ICTs. The reason for doing so will be explained later in this section. Therefore, first, a general exploration towards the attitude and readiness to digitalization in the frame of creative work will be carried. Then, different themes that are relevant to those industries in the context of digitalization will be presented, and finally, previous studies on each of those specific industries will be used as examples.

Before continuing, the term "creative industries" should be properly defined. "Creative industries" is a term that was adopted towards the end of the 20s (Towse, 2011) and collectively refers to industries carrying activities which originate from individual's personal creativity or skills and from which a profit can be generated. Examples of creative industries are cinema, game industry (i.e. interactive leisure software), architecture, advertising, design or performing arts. The latter will be avoided in this section, but discussed in detail in the next chapter, because as it is the focus of the thesis, the research will be more thorough and, therefore, addressed in a chapter on its own. However, for some people, there are different categories in which the aforementioned industries belong. For example, arts, cultural industries (where copyright is applicable) and creative industries (with practical functionality) (Townley et al., 2009). In this paper "Creative industries" term will be understood as the former (i.e. without classification of categories).

Recently, there has been a raise in academic interest towards creativity and the creative industries (Hesmondhalgh, 2008), as digital technology is changing how creative work and art is being produced (Oates, 2006). Through the last years of past century and the beginning of 2000s, creative industry's strategical development has proliferated, however, some criticize the capitalist behavior and exploitation that digitalization is bringing to the creative industries (Hesmondhalgh, 2008).

These claims have developed from the fact that some of the creative industries were perceived as artistic and artisanal, rather than as an industrial-scale production of goods to market for commercial businesses and create profit (as it is the case of performing arts compared to advertising, for example). It has been the development of technologies the mayor cause for this mass-commercialization. Indeed, digitalization is altering the most traditional practices, which might cause profound consequences in creative industries (Towse, 2011).

Nevertheless, digitalization has also brought huge opportunities and developments for creative industries. Creative economy has grown and human capital remains the most valuable resource. Consequently, creative industries may find valuable not only technology that supports the production of the product or service, but also IS that assist with business development and analysis, account management, improvement of creative skills and gathering of data (Cunningham and Higgs, 2008).

Therefore, the use of information systems and technologies for efficient communication, gathering and management of information is a key aspect of these industries. In the later

given examples, the opportunities that using information and communication technologies (ICTs) present in the context of digitalization will be presented. Overall, creative industries make use of ICTs to make their work more efficient, by eliminating boundaries and gaining greater control over their own activities. This gained control over their data, will provide them the means to develop more suitable strategies for their businesses (Porter and Millar, 1985). As it will be noticed, these digital solutions are aimed to ease the creative planning process. Thus, overall, creative industries are in line with the previously introduced theory of IT/Business alignment.

Hence, before starting to address the examples of digitalization in creative industries, it is important to explain why those have been the chosen creative industries to be compared with theater, amongst all the creative industries. On the one hand, the particular reason for choosing architecture is the fact that, as well as theater, it is an ancient industry which started before there was any technology at all; thus, it is interesting to compare the different evolution each has had. Similar is the reason for choosing design and advertising industries, both are very old and long-standing industries, so it is appropriate to describe how the production of their art has been altered by the technological revolution and ICTs. And regarding cinema, needless to say that amongst all creative industries it is the closest one to theater; in fact, it has developed from theater, therefore, it is the most relevant to be compared with.

On the other hand, videogames and software industry has been left out because their creative projects are very different to those of theater, in essence, thus, it has not been considered suitable for comparison. The remaining creative industries have been left out because the aim of this chapter is to just give a glimpse of the current differences between theater industry and few other creative industries, not to make a full and in detail report amongst all creative industries. Nevertheless, the comparison of all creative industries could be an interesting research topic to take into further research.

Following, as examples of the aforementioned facts, a particular description on how the previously mentioned creative industries are facing digitalization will be presented. For a later comparison with the circumstance on the same subject in the performing arts industry (more specifically, in theater).

3.1 Architecture industry

Architecture is a great example on how an industry that is considered to be creative and has been closely linked to art throughout the history, can, at the same time, be science. Most times, art and science follow parallel paths and they are understood as independent subjects. However, in architecture this two fields meet each other. Architecture requires knowledge both in creative matters (e.g. painting, aesthetics, design) and scientific branches (e.g. mathematics, physics and chemistry) (Jenks, 1999).

In fact, it is that scientific side of this industry which leads architecture to evolve and be highly influenced by technological developments. In the 19th century industrialization made a great impact on architecture, it changed the mindset of architects on how cities should be built (e.g. to foster the growth and hygiene), new materials for constructions

were introduced (e.g. reinforced concrete) and the growth and movement of the cities was accelerated. Furthermore, industrialization boosted engineering and this, future developments of new technologies (Benevolo et al., 1963).

Consequently, modern architecture was developed together with industrial evolution and later with the innovations of the 20th century. The pioneers of the modern architecture insist on the idea that the architecture needs to evolve together with the society and not stay static in the past (Norberg-Schulz, 2019). Hereby, nowadays architecture is determined by a specific society and technologies (Vila, 2003). For example, the use of software is widely spread in architectural practices and many of the current constructions wouldn't be possible to achieve without advanced technology.

Moreover, when looking at the latest developments and applications that technology can provide to architectural planning, multiple tools come to mind, such as: 3D software for modelling, virtual reality (VR) and 3D printers. These days, architects make use of various software appliances for planning, analyzing and modelling their designs. Some of the benefits they can get from 3D printing and modelling software are ease on sharing designs, speed on designing realistic looking designs, and cost and time decrease on the reproduction of prototypes, automated manufacturing (Berman, 2012) While benefits of virtual reality (VR) for architecture are possibility for design review, simulations of dynamic operations, and construction scheduling, marketing (Whyte, 2003). In conclusion, it can be said that digitalization is very well integrated in this industry.

3.2 Design industry

The creation of artistic graphics with the use of digital technology (e.g. computers) can be tracked back to the 1960s, by events such as: an exhibition of digital designs by Georg Nees and his fellow workers in Stuttgart (Germany) in 1965, the establishment of interdisciplinary art, science and technology journal called *Leonardo* in 1967 and the founding of the *Computer Arts Society* in 1969. In fact, the increasing popularity and recognition of World Wide Web for generating digital animations increased the interest in digital art (Oates, 2006).

Within design industry multiple categories can be found, for example graphic design, fashion design, interior design, webpage design, etc. Nevertheless, this section does not focus in any of them specifically, but in the design industry overall and how digitalization is affecting on it. When it comes to the process of creativity, the continuous developments on digital technology offer great opportunities to create and transform (Quantrill, 2002).

Nowadays, designers use and need a set of digital tools (i.e. software) to prepare their designs, independent to the field of work. Furthermore, academic programs already introduce such digital tools to students together with more traditional design skills and principles (Arntson, 2011). Therefore, the training and learning processes start from the early education stage on the industry.

Amongst the most popular tools for designers there is one which is called *Soft-board*, which is a combination of hardware and software. The soft-board is like a white canvas, where designers can draw their designs and then, through an integration into a computer software, the drawing or data entered in the soft-board is transferred to the computer. This

enables and eases further editing, saving big amount of works, transferring, analyzing, communicating, etc. (Quantrill, 2002).

Furthermore, Oates (2006) proposes to look at computer art and digital graphic design as an IS. Since Information System's main goal is to inform the user, and the core of design is to communicate (e.g. an idea, a belief, a feeling, a visualization of data) – moreover, every design has in essence its own meaning and identity (Barnard, 2013); the application of the knowledge and understanding of design principles into IS can result on a better use of information and its communication (Oates, 2006).

Hence, it is clear that digitalization is highly integrated into design industry and vice versa, design is setting certain basics for digital technology developments (e.g. analytic software, webpages, browsers, system interfaces).

3.3 Advertising industry

Nelson (1974) highlights the major feature of advertising as its function of providing information for consumers. On his side, Dyer (2008) also agrees with Nelson's statement and defines advertising as the act of "*informing somebody of something*" – or "*drawing attention to something*" (Dyer, 2008, p.2). Advertising is a highly organized industry, where art and creativity are also involved. Nevertheless, in this section the approach is going to be generic, as in the previously described industries, and without entering into subcategories. Anyhow, it is worth mentioning that despite possibly being the commercial consumer advertising the most noticeable one, it should not be forgotten that there are other types of advertising activities which final goal is not to make profits, but to simply inform and communicate (Dyer, 2008).

It is difficult to set a beginning for advertising, although this practice has been around since ancient civilizations. Changes in societies have led to changes in advertising. First, the capitalism throughout the 20th century and now, the globalization and homogenization of markets in the 21st century (Cook, 2001). Thus, as technology moves forward, so does advertising and its creation process. Certainly, advertisers today do not use the same technology they used for, for example, TV ads back in the 50s (Cook, 2001).

Nowadays, online advertising has become crucial for the industry. The first commercial online advertisement was published on a web-based magazine called HotWired from a banner sold to a company with the name of AT&T, in 1994. That boom of webpages triggered the birth of search engines, which later would make money out of the advertising industry through the *cost-per-click* model (i.e. they only make money when a user clicks the ad the search engine is advertising). And similarly happens with non-commercial advertisements, for example, for the promotion of a healthy diet and lifestyle, people make use of online platforms (e.g. social media and blogs) to promote these not-for profit messages (Evans, 2009).

Advertisers, online and offline indistinctively, make use of digital devices to plan, create, evaluate and analyze the success of their ads (Evans, 2009). For example, there are systems to edit video and audio (e.g. for ads on TV and radio), systems to create digital content and graphics (e.g. for static ads) or systems to make statistics on how people interact with their ads. Additionally, they have to keep up a database in their computers

to maintain all the advertisements and to be able to use digital tools, for the aforementioned purposes (Gifford, 1998). Therefore, it can be concluded that digital ICTs are essential and strategical tools which are well implemented in the advertising industry.

3.4 Cinema industry

Last creative industry to be introduced is cinema industry, which is the most similar to theater industry amongst the mentioned creative industries, as both belong to the category of performing arts. One could think of this industry as the digital theater. In fact, the venues where films were projected were called theaters. In Manhattan those were known as Nickelodeons and already by 1908 they had revolutionized theater recreation (Grieveson and Krämer, 2004).

The history of commercial film industry is linked from its inception to World-changing developments and technology. It begins in the laboratories of Thomas Edison, in 1887, with the creation of a camera named Kinetograph. The films taken with such camera were viewed in a continuous sequence through a lens set into a box, not projected. Furthermore, it was in 1891 when the laboratory built its first movie projector (Allen, 1979). And so, the following thirty years entailed the movie industry into an unprecedented expansion, beginning in the most powerful industrial cities – New York, Paris, London, Berlin – this new form of entertainment grew larger and larger all around the world (Nowell-Smith, 1997).

Cubitt (2005) suggests to approach the motion of images from a digital perspective, in comparison with the framework of creative industries and art history during the time preceding, which were still images, until the creation of the moving image. Hence, as it has been said, technology has always been part of this industry – new innovations in technology could raise film producing companies. For example, the biggest technological innovation during the first decades of the industry was the introduction of sound in the late 20s (Balio, 1985).

Much has changed in the last century in matters of digitalization, however, since the production of films is a costly and jeopardized industry, it has been essential the development of ICTs and digital systems to control the production and other aspects of movies (Ghiassi et al., 2015). Furthermore, with the development of the Internet, the movie production and distribution process' risks and vulnerabilities have increased (Byers et al., 2003).

Movies are projects in its essence, as the launch of a new product or service could be. Nevertheless, the production of movies has some particular characteristics (Ravid, 1999). Cinema industry is not at all alike to traditional organizational hierarchies or in-house departments (e.g. human resources). It is arranged in short-term relationships and informal personal networks (Jones, 1996). Yet, for such expensive industry it is absolutely necessary to have total control over all its resources (Ravid, 1999). It is then when IS and ICTs play a key role within this industry, to properly manage and share all the right information.

In short, quoting Nowell-Smith (1997, p.18): "*None of this would have happened without technology, and cinema is in fact unique as an art form in being defined by its technological character*".

4 DIGITALIZATION IN THEATERS

The following chapter aims to give a brief introduction on the historical background of theater. The purpose of this is to acquire a better understanding of where theatrical practices have started and how the industry has developed over the centuries. Once the basics have been understood, the chapter moves on to describe the relationship between theaters and technology. It highlights the strong relationship that theaters have with digital solutions regarding the sales-presentation aspect, and aims to recognize the uncountable number of researches that have been carried on that matter. To later highlight the gap found in that same literature review, which is the topic of this thesis and the core of the conducted research.

4.1 Historical background on theater

The history of the development of theater into an experience that challenges social and personal existence while enjoyed together by big and small audiences goes all the way back to ancient times. Representations, performances, games and plays have always been part of human nature, as instinctive causes of joy, pleasure and entertainment (Brown, 2001).

As previously said, the following section will briefly introduce a concise historical background on theater. However, despite browsing through different centuries, this glimpse to theater history will only take the viewpoint from European and English-speaking cultures, rather than a worldwide view. This is a limitation to take into consideration in this study, which will be discussed deeper in later chapters. Nevertheless, the alternative of adding to the narrative a whole worldwide picture seamed unmanageable for the scope of this thesis, due to the tremendous differences on theater and culture between west European (i.e. Athens, Roman, Christian), African and Eastern countries (Brown, 2001).

Therefore, any European theater history study most likely will start with the narrative in Athens. For this reason, the structure of the present section will be as follows: first, an introduction of Greek theater and its beginnings will be described, to then study the evolution of theater through the Roman period, the impact of Christian religion and then 19th and 20th centuries. In fact, it is when reaching the 20th century, after 1970, that theater can be looked in a more globalized manner, but not before. This final look into the modern era will serve as bridge to the next section, where digitalization in theaters will be discussed.

Considering that this master's thesis is all about theater, describing what theater means seems like the right place to start. Theater (or theatre) is a term used to describe the act of performing, taking part on the action two kind of roles: the viewed (i.e. the actors/actresses, the ones acting) and the viewers (i.e. the spectators, the ones watching); thus, a certain viewing space is always needed. Yet, the space can be very diverse (e.g. it can be a stage, as well as a street). The word "theater" comes from the Ancient Greek word *theatron*, which literally translated means a "*place for viewing*" (Stern, 2013). So do the words *drama, tragedy, comedy, scene, music*, etc. (Brown, 2001).

Historically, the two most known branches of theater, comedy and tragedy, were invented by a single developed community due to a developing change on political status. In the 6th century BC, the city of Athens grew to become one of the most powerful cities, which triggered an empire of cities fostering the investment of time and money on intellectual academic and artistic activities. From that era are the Acropolis and philosophers such as Socrates and Plato. And from such society emerged the drama, a practice that provided theater to last for centuries to come and that didn't encounter rival until William Shakespeare's era (Brown, 2001).

Athens' citizens would gather in early spring to celebrate the fermentation of wine and the end of winter in the Great Dionysian festival. The most important element on this festival was, indeed, the performance of tragedies, which were devoted to the God Dionysus (the god of grape-harvest, wine and fertility) and were presented on a three-day span. This festival was contemplated as the most significant and influential cultural event in Athens. Important to the point where the spectators were paid a *theorikon* (i.e. a spectator's salary) every time they watched a performance, as this act was treated as a social duty (Fischer-Lichte, 2002).

The oldest tragedy known to have survived to this date is from the year 472, and it is considered to be the origin of the European drama history. This tragedy is Aeschylus' *The Persians*. However, the very beginning of this practice and from where it developed remains unknown. The records only point out the first mention of a tragedy performance in the Great Dionysia celebration in 534 BC (Fischer-Lichte, 2002).

In contrast to the artistic, philosophical and academic character of Greek society, Romans were strong, had a powerful army and desires to expand. Nevertheless, before the expansion of the Roman empire, Greek was considered to be an international lingua franca, spoken in all the colonies spread all around the Mediterranean world; and Greek art and culture being exported to all those places as well. Nevertheless, it wasn't until the third century that the first Latin tragedy was written. Indeed, it was a translation of an epic Greek tragedy made into Latin (Brown, 2001).

Thus, theater was a Greek practice celebrated on a festival, that got transferred into Roman culture and celebrations. In fact, Roman desires to grow and conquer the world lead to the appropriation of Greek culture. As it would have been infeasible to win over and conquer the Greeks by conceiving a new culture and intellectual life from scratch; hence, they appropriated Greek achievements and adapted those as their own (Brown, 2001).

In later years, the Roman Empire evolved into Byzantium, and it was before this shift that Graeco-Roman theater culture was at its peak (Brown, 2001). Ancient societies and cultures continued to develop through the years and centuries and by the end of the seventh century, Christianity had gained such power, that Church made the following statement, to ban:

> "*dancing and mysteries performed by men and women according to an ancient custom alien to the Christian life. No man is to wear female dress, nor woman to wear what belongs to a male. No-one is to don the masks of comedy, the satyr play or tragedy. No-one is to shout the abominable name of 'Dionysus' while treading grapes in the press, nor celebrate the wine-pouring.*" (Brown, 2001, p.64).

For the Christians, theater was an element of an opposed religion and it was considered obscene. However, in a similar position as the Romans, they couldn't just eliminate this cultural act, thus, they had to appropriate it to the new religion. In the Medieval Period, theater performances were moved from its traditional semicircle building to amphitheaters (e.g. hippodromes) (Brown, 2001).

Taking a big jump in time, all the way to the 16th century, one more time a mayor change worth mentioning took place, this time being English society the placement. The late years of the 16th century reflect a mayor break with the past. By 1580, most ritual practices and popular festivities of the medieval Catholic society were abolished by the Elizabethan regency. The newly stablished state ceremonies did not address nor relate to the lives of ordinary medium class citizens, hence, the English men and women sought for an entertainment practice closer to their reality. Theater turned out to be the most common replacement (Montrose, 1996).

Therefore, the late medieval cultural mix of entertainment practices and civic religious drama originated the era known as the London of Shakespeare. William Shakespeare was part of a theater company called Lord Chamberlain's Men and was one of the owners of the first theater venue owned by the players themselves, built in 1599, which was also their permanent home. These changes and practices led to the conversion of theater into an entrepreneurial and professional industry of entertainment, and made those player-entrepreneurs, such as Shakespeare himself, achieve wealth, fame and respect (Montrose, 1996).

Moving on into the 19th century, there are a few matters to bear in mind. On the one hand, in 1880, the theatrical concerns faced a new direction. This time, towards the art of acting. A new movement began to place attention to the actors and actresses, who were defended as independent artists that used the dramatists' texts in order to produce its own art (Carlson, 2018). On the other hand, the diverse audiences of the 19th century play an important role on the development of theater. The audience attending the plays on a theater varied as it did the class, income, safety of the area, transportation or cultural tastes. It has been said that theater had evolved to be seen as a business, and it is important to consider that in the 19th century every play performing on a theater was totally dependent of the box office (i.e. ticket sales), as none was subsidized by the state. Therefore, theater's choice of the kind of drama that would be presented (involving the actors, plays, production methods, pricing…) was subject to the public. In other words, the content and style of the plays was determined by the business (Booth, 1980).

Thus, even if the most known and studied English theater in the 19th century is the West End, the fact is that there is evidence to state that the majority theater-goers in London and other provinces was constituted by the working and middle-class audience of the East End and similar low-working class areas (Booth, 1980).

By the 20th century, theater audiences had increased. Nevertheless, with the latest technological developments, a new cultural trend was born, cinema. This led to the growth and spread of the places where movies were shown, resulting in a rivalry between theaters and the *picture palaces* (Nowell-Smith, 1997). One reason for this audience increase might also be the economic prosperity and growth experienced between 1860s and 1920s (a.k.a. the Happy Twenties), which brought wealth to the citizens, who could spend more time and money in leisure (Booth, 1980). Moreover, later on the century, a

new entertainment rival for theater would emerge, with the extended use of a new medium developed by the engineers of the time: television (Biocca, 1992).

Furthermore, in the 20th century a new movement began, that would revolutionize the arts, futurism. After the industrial revolution, with cars starting to be accessible to the masses and upcoming technological developments, theater, as any other industry, was also affected (Drain, 2002). Later in the century, computer technology would also bring new possibilities to the scenic arts (Bratton and Bratton, 2003), with the inception of the world-wide-web in the 90s (Tajtáková, 2014). Therefore, it is difficult to briefly cover the theater of the 20th century, since a vast variety of theatrical practices were born. An example of this experimental futuristic theater are Samuel Beckett's plays, where the traditional conception of theater was challenged (e.g. lacking plots or minimizing actor's visibility) (Counsell, 2013).

To sum up, despite being able to frame the mayor differences between classical, medieval and modern world, it is difficult to draw a constant evolution of theater as a homogeneous cultural tradition. The available records show a complex picture, with no single path, but with different historical narratives and generalized dramatic tendencies. For example, during the medieval period, the theater was not solely and purely Christian, but there are facts that prove a continuous tradition of performing Roman comedy, even in the twelfth century. Thus, the identification of mayor genres and trends is possible, but it does not mean those were the only ones of each period (Brown, 2001).

4.2 Development of technology in theater context

By end of the 20th century, with the development of computer-controlled technology and new social circumstances, theater was facing rapid changes and increase of possibilities as never before. However, when looking at a theater venue or to actors performing present political and social issues, even if the topic, the props and the manners of moving on stage have changed, one can still see the resemblance with the ancient practice and realize that the essence of theater has remained timeless (Brown, 2001).

However, the fact that theater has remained 'old-fashioned' in its way of communication does not mean theaters are not interested in technology nor digital solutions. Opposite, theater industry has been embracing technological innovations from the beginning (e.g. electricity, light and sound technology, digital stage tools, video, etc.) (European Theater Lab 2018).

But before pointing out the main digitalization and technical developments affecting theater in the past decades, it is important to highlight some of the elements that have remained inherent to the performing arts. Nevertheless, this does not mean that performing is impossible without all of them. These basics elements associated to theater are: a plot, speech, a director, the scenery or props, a stage, the lights and sound, the audience and the actors (Stern, 2014).

Thus, once having pinpointed the main traditional elements of theater, the following section aims to introduce the latest innovative procedures applied on those and reflect on how technology and digitalization is developing theater. Nevertheless, the section will be presented in two subchapters. On the one hand, several examples of digitalization and

innovations related to the sales-presentation aspect of theater will be exhibited. On this matter, numerous researches and countless articles can be found. On the other hand, it needs to be reminded that the focus will be on digitalization and innovations as information systems for theater organizations. This last part is the basis for the later research analysis, since it reflects the gap found in theater literature: how do theater organizations communicate and share its business-related information and knowledge?

4.2.1 Digitalization on sales-presentation aspect

The aim of this section is to present several technological developments of the latest decades (i.e. the Digital Age) and their impact on the performing arts; in theater more specifically. Furthermore, already in 1994, Pierre Lèvy foresaw the impact that technology would have in everyday and any kind of human activities, including the arts (Tajtáková, 2014). Bear in mind that the purpose is to evidence the lack of information regarding ICTs (i.e. there is no previous literature on how theaters are implementing IT and IS). Thus, there will not be any reference to the first chapter of this thesis.

Yet, there are numerous examples on how digital technologies significantly continue to influence and inspire new and modern artistic expressions. Some examples will be introduced soon. In fact, new devices can provide novelty to the performing arts from different perspectives, (1) as creative and exploratory tools (e.g. to foster engagement of the public with the theater) and (2) as tools to communicate with the environment. So far, in theater, the strongest impacts that digital technologies have had are related to their productions and the spreading of information to the public, such practices involve replacing physical or analog objects or mediums to digital files and platforms (Tajtáková, 2014).

Stage elements (a.k.a. props and scenery) have been influenced by digitalization and new technologies, developing the so-called experimental theater; ranging from sound and light effects to virtual reality (VR) and interactivity. Furthermore, digitalization in theater is growing (Tajtáková, 2014), as the digital impact nowadays can also be seen in marketing and broadcasting (Kenber, 2013).

Hence, it is important to measure and keep an eye on the impact that digitalization is having on the industry. Computing, and increasingly more accessible internet access, create a potential combination for that (Thomson et al.,2013). Next, various examples of such technological developments will be introduced. For example, broadcasting real time performances in cinemas around the world, digitizing the whole theatrical experience (Kenber, 2013). Moreover, theaters can find uncountable tools and resources in Internet for carrying online activities such as promoting events, selling tickets, and provide customer service (Thomson et al., 2013).

Spread use of digital tools in theater can also be found in areas such as iconography. That is, non-text material that theaters employ in their performances (e.g. paintings, drawings, posters, costume designs, elements of scenery as well as marketing designs of pamphlets and programs). There has been a wide digitalization on this matter, and not only in the tools used to create those elements (e.g. computer systems and software, printers…), but also in the creation of databases to document all this non-text material used in the productions, including film, sound, light settings and digital video (Rodenhuis, 2012).

Looking more closely to the areas of theater related to audio, video and text, this is somewhere where mayor changes can be noticed compared with last century. Digital technologies and the Internet offer vast possibilities when it comes to transportation and creation of products (Towse, 2011). For example, in the fields of visual effects (VSX) and computer-generated imagery (CGI) (Cipriani and Fantini, 2017). Visual digital technologies are included in theatrical performances as a source for astonishing, marvelous and remarkable presentation that produce excitement and stimulate the audience. Examples of these presentations used on stage are: digitally manipulated projections, robots, digitally created avatars (with their own role) (Abuín, 2008), use of light and sound effects designed with software even means to help viewers with disabilities (e.g. deaf people can get augmented reality (AR) glasses to read their own subtitles).

However, most of those mentioned digital technologies are just developments of tools or elements created already in the past (e.g. light is nothing new to us). There is something, though, that has gained importance when it comes to socializing and market, and which is completely an invention of this century: social networks. Social networks are an important marketing tool for theaters, as well as their webpages, where they can share information on their productions, events and activities, while being easily accessible from anywhere their target public might be. Furthermore, in such platforms they can share image, video and audio content from actual performances in order to promote those, as well as share offers and promotional campaigns (e.g. to win free tickets) (Towse, 2011).

For theater technicians and designers there is also a widely spread use of 3D modelling software for a more realistic visualization of theater designs (Carver and White, 2013). Likewise, enhanced visualization technologies have been developed to visualize sets and environments while performing on stage (e.g. 3D projections), in order to improve the theatrical experience of the audience, which can challenge the real and physical boundaries of the material body (Lane, 2003).

Going a bit further in digitalization for stage settings, completely virtualized theater can also be found. That is, expanding the physical limits of the theater and introducing the audience deeper into the performance with the use of virtual reality (VR) and, as a previously given example, AR (Abuín, 2008).

Virtual Reality can be defined as a multisensory communication technology controlled by a computer, and in order to be able to experience it a head-mounted display is required. The head set contains a screen and audio, which allows the user to feel present on that simulated reality as if himself/herself would be part of the story. This technology was first introduced in the year 1992 and by the year 2000, VR was expected to present mayor developments on telecommunication and entertainment industries. Nowadays, however, it continues to be developed and researched, and many more different applications through different industries have been found for VR (Biocca, 1992). Yet, VR still presents multiple limitations, such as its expensive cost or the induced sickness symptoms and side effects (e.g. nausea or disorientation) on the users (Sharples, 2008). The challenges that the cost of technology entails will be discussed in the next chapter.

Augmented reality goes a little beyond VR, as it is a hybrid between the real and the virtual. In AR, real-world scenes are "augmented" by computer-generated elements and information in real time. AR also affects to different senses. Thus, a display is required in order to be able to experience it. As VR, AR has numerous applications for different

industries, such as manufacturing, health or entertainment. For theater, this new technology presents great opportunities. For example, productions and shows can be enhanced and expanded further than the limits of the stage, creating a hyper-reality for the audience. That is, it originates a more intimate interaction between the actors, the audience and the machine (Abuín, 2008).

The fact that theaters are starting to embrace the latest digital technological developments is creating a movement that some people is calling "technodrama" and "mixed reality". Nevertheless, some others do not feel the attractiveness of involving technical innovations in such traditional industry. Thus, the following questions arise: how far can technology go in theater? "*Is there any line technology should not cross, when the drama itself becomes compromised, in any age*"? (Shaw, 2012). There are many, in the theater community, defending that all those digital applications and enhancements just distract people from the performance. And they argue that all those digital effects break the actor-audience relationship, turning theater into TV or cinema. Others, nonetheless, affirm that in order to keep the balance the key element is to maintain the human element. Thus, the defenders of digitalization insist on stating the fact that theater will change, as the new generations have born with digital technologies integrated in their lives, developing a different relationship with the medium (Shaw, 2012). For the data analysis chapter, a section has been reserved to discuss in more detail about how the future of theater is perceived.

Sure-thing is that making theater accessible for a larger target audience is positive, as it allows theater to grow. The dispute is on acknowledging whether the digital revolution is putting at stake theater's artistic credibility. Which it appears to not be an easy task to do, since theater is by nature inquisitive and revolutionary. Theater tells stories which have always reflected the society of each era. It is closely connected with the reality of the moment and the human existence, which is increasingly internet-based (Kenber, 2013).

However, there are several challenges presented that have been identified, on the one hand, regarding how digital technology is affecting audience expectations towards the performance, such as: higher expectations for the quality of the performance; the whole action of going to the theater is no longer seen as attending a cultural event, but as living as experience; part of the experience will also be the purchase of the tickets, which the audience will expect to be able to acquire digitally (i.e. online purchase of tickets); there are costs of maintaining the online "free" resources that are provided to the public (e.g. the information on the webpages and social media is free, but the person behind it not), which are usually overlooked by the theater goers, who then wonder why the tickets are so expensive. And, on the other hand, regarding the high financial costs of those digital devices (Tajtáková, 2014). Yet, another constraint resides on the implicit expenses that those digital appliances require. Even when the tools are free, there are several investments (on money and time) to be made, as the staff needs to be trained and technical and technological infrastructures are needed, amongst others (Thomson et al., 2013). These challenges will be addressed in later chapters as well.

Hence, in theater's sales-presentation aspect, lately most digitalization practices have been carried in the scope of (1) computer generations and actors on stage interaction and (2) audience and stage interactions (Tajtáková, 2014). Therefore, as stated at the beginning of this section, most of the presented digital technologies' goal is directed to the show or production presentations on stage (i.e. to sales) and not to the planning process and information communication within the organization.

Stating Tajtáková (2014, p. 6) "*the ways in which art is created, produced, distributed, marketed, preserved and supported are shifting – in some instances transformed – in relation to the transition to a digital society*". There is a kind of fragility feeling that theater emanates towards the future, a kind of breathlessness for how it is going to evolve. While some ask: will digitalization end theater? Others state that theater will certainly remain alive, and that the right question to pose is: in which forms? (Lambert, 2012).

4.2.2 Software as a planning tool

The development of digital technologies has made a big repercussion in the sectors of arts and culture (Tajtáková, 2014). However, as it has been just seen, in the field of theater, most research has been focusing on the creation of virtual worlds on stage. The information management medium that digital technologies (e.g. IS software) provide has been far less researched (Biocca, 1992), compared with the research made on this matter for other industries. Thus, the following section aims to highlight and acknowledge the gap on the theater literature review in regard to information and communication systems use, to show how theaters, as a business, manage their internal information and knowledge.

The first personal computers were perceived as a personal medium, more like a fancy typewriting machine, rather than seen as a medium for human communication and interaction. Nowadays, however, many of the activities carried on a computer are a form of interaction with other people. Furthermore, it could be said that all computer-based activities are, in a way, an intercourse between humans; as the nature of the programmers and designers are the roots of these technologies, human logic remains resident (Biocca, 1992).

The communication power of the Internet is becoming the engine in the process of formation of a new society. New forms of mass information communication are being conceived (e.g. SMS, blogs, podcasts, etc.). As a result, digital content is easily shared and reformatted through peer-to-peer (p2p) networks in everyday life (Castells, 2011). All the information is suddenly accessible by anyone from anywhere, and the distance as a social constrain dies (Graham, 1998). Hence, software is an extension that allows a growth in communication. And thus, participation is not anymore limited to the physical theater space (Mcleod, 2014). Nevertheless, despite the evidence of an increase of digitalization and the personnel substitution this entails, traditional face to face activities and interactions on physical spaces are yet much needed and maintained (Graham, 1998).

Biocca (1992) also argues the fact that as users start to think within the means, new psychological processes are developed. Thus, while some people are more focused on the repercussion that the medium's content produces, others are more concerned with the medium's form and its impact on the organization's information. A great amount of information can be found regarding communication technologies and social formation, as it has been shown in previous sections of this chapter (i.e. IS and IT), however, very little research has been conducted on how those apply and affect theater business. For example, in matters such as centralization or decentralization of information, modifications in the quality and quantity of work or the configuration of communities (Biocca, 1992).

In the last decades, an evident proliferation of outsourcing, cloud technologies and software-as-a-service solutions has taken place, due to the implications of IT innovation ecosystems (Coltman et al., 2015). And as it has been introduced in the first chapter of this thesis, multiuser applications have been proven to have a positive effect on communication within business communities (Biocca, 1992). However, the most commonly used tools by theaters in terms of digital collaboration, communication and information sharing are email, Skype, WhatsApp, and shared calendars, and little mention has been done regarding the use of tools (i.e. software) specifically developed for this industry with the same purpose. Furthermore, students of some other industries are already being introduced tools for information and knowledge management. Yet, theater appears to remain pretty traditional concerning this matter.

Therefore, the goal of the conducted research is to dive deeper in this matter, in order to gain more knowledge concerning how theaters manage their information and share their knowledge internally, as a business. As well as to start filling in this sensed gap and to provide a novel approach of a topic to be taken into further research.

In short, information and communication technologies are the base for the development of knowledge society (Tajtáková, 2014). And digitalization should be an enabling condition for theater, as digital information systems and technologies have the potential to generate participatory communication platforms for internal theater personnel. In fact, such tools are increasingly more accessible and affordable for theaters to purchase (Mcleod, 2014).

5 METHODOLOGY

Once the background literature has been introduced and the aim of the research formulated, the following chapter's goal is to present the methodology that has been chosen to carry out the empirical study. The latest technological, cultural and economic transformations have originated a new form of society, more digital and connected (Castells, 2011). Hence, the methodology applied for this study will hopefully contribute on achieving further insight on how this network society is affecting theater production planning.

5.1 Research methodology

This chapter aims to give answers to the following questions: (1) what is the research goal (2) how was that goal achieved (3) motivation of the chosen methods (4) who is the target population of the study and (5) when was the study conducted?

The idea for this study started out of two assumptions. On the one hand, there was a perception that theaters are in need for a sector-specific information management tool (this perception was based on own experience, due to being in direct contact with the industry). On the other hand, the evident lack of research made on this field. Through a deep background literature review and research on previous studies, the later has been proved to be true, as evidenced in the previous chapter. Hence, the study goal was to prove the former. But as it has been said, through the formulation of assumptions, rather than a hypothesis.

Consequently, how was this study conducted? As a first step, it was decided to conduct a quantitative research, which was set to be the main data source. The motivation for choosing this method was mainly its ease of application and subsequent data analysis. Mujis (2010) quotes Aliaga and Gunderson (2002) to state the definition of quantitative research as a method to gather numerical data which can later be analyzed mathematically – in most cases through statistics. However, one may think that this kind of methodology is not the most suitable for this thesis, because nearly all the data that needs to be collected for this subject is not presented in numerical forms. Nonetheless, Mujis (2010) explains that it is not a problem. Even when addressing data that is not numerical in nature, it can be collected in a quantitative way. This is done through the development of instruments specifically designed to convert qualitative data into quantitative. For example, with questionnaires (Mujis, 2010).

Hence, a questionnaire was designed for this study, which was presented as an online survey. This survey was introduced to the target sample via email. The survey method was chosen because of several advantages. As Wyatt (2000) lists, web-based surveys are more inclusive, as they provide further reach than, for example, surveys sent via post mail or done via telephone. With online surveys the researcher can also save money (e.g. no printing, no calls, no travelling to different locations). Regarding the analysis of the data, as the data is already obtained in a digital format, the analysis part is more efficient, which also allows to collect larger amounts of data. Overall, the whole process' speed is higher than compared to other methods – the researcher creates the questionnaire, forwards the survey and waits for the replies. Additionally, a quantitative research carried with a survey allows less biases and external factors to influence the results. And with the possibility of

transforming the qualitative information into quantitative, statistics can be generated, which at the same time brings the possibility of finding patterns within the sample and explaining relationships between the variables (Mujis, 2010).

Next, a qualitative research approach was conducted, as a support to the information collected through the survey to gain deeper understanding of the matter. There are multiple qualitative research approaches (e.g. interviews, focus groups) (Sofaer, 2002), but in this case, face-to-face interview was used as the additional data collection method. Quoting Sofaer (2002, p.330) "i*nterviews are considered by many to be an essential element of testing the reliability and validity of survey instruments*". Indeed, the choice of method was motivated by the possibility of retrieving deeper thoughts and arguments on the topic. Interviews and surveys are the most utilized research methodologies (Ghauri and Grønhaug, 2005).

Qualitative research is very useful when, instead of numerical data, the researcher is looking for descriptive data retrieved directly from its study sample. In an interview, the data is collected through the interaction between interviewer and interviewee. The interviewer asks the questions and listens very carefully to the interviewee's replies, to later compare the collected replies within the sample (Taylor et al., 2015).

Face-to-face interviews were chosen as the data collection method as it many advantages compared to quantitative methods, for example, the data collection is carried in real time, the respondents get the chance to express themselves more freely than in a closed question of a survey, and they also get the opportunity to reason their replies (Ghauri and Grønhaug, 2005). Nevertheless, this method was not set as the primary data source due to the fact that interviews pose further limitations and challenges than online surveys (e.g. it does not allow proper generalization, the understanding of the replies is subjective to the researcher's knowledge and experience, there are higher chances that the answers are biased) and also for how time consuming the whole process is (Choy, 2014).

In the next section the questions of "who is the target?" and "when was the study conducted?" will be addressed. To give more insight on how the described methodology was implemented and how the relevant data was gathered. Afterwards, and before the data analysis, an important section to bear in mind will be presented: the research limitations.

5.2 Implementation and data collection

The first thing to highlight regarding the questions presented in both survey and interview questionnaires is that they were tailored based on the research questions that had been previously set for this research. Thus, both questionnaires consisted on structured questions (Ghauri and Grønhaug, 2005) (i.e. there was an arrangement of questions already set to be followed). Nevertheless, this does not limit the possibility to use open questions (Sofaer, 2002). As it has been explained, the survey was carried first and only later, the interviews. Hence, the interview questions derived from the survey, as the idea was to gain deeper knowledge on the same matters.

In order to explain how the quantitative and qualitative methodologies were implemented for this research's data collection process, a framework needs to be set. Therefore, is was important to define to whom this research is addressed.

In order for the data to be comparable and contrastable, there is a need to set a criterion, which had been previously studied, in order to create an analysis unit. That is, all the organizations in the selected sample needed to meet the defined criteria in order to be able to participate in this particular research. This is a crucial aspect when conducting international researches (Ghauri and Grønhaug, 2005). Therefore, the scope and criteria for this research was set as follows. The target sample were producing theaters and theater producing companies. Within these organizations, the people that were contacted to fill in the survey and reply to the interviews were people with positions related to the planning process (e.g. production directors, general managers, technical directors, stage managers). There was no limitation on the size of organizations, thus, those could go from very small theaters up to huge national theaters. Neither there was a limitation on gender. Nevertheless, the research was, indeed, limited to European countries' theaters – this limitation will be further examined in the "limitations" section.

The aforementioned criteria derived from the assumptions made on this particular business framework, as well as from the gap in the literature review on this matter. Both questionnaires were tested and developed with the help of an expert on the field and also checked and approved by the supervisors of this thesis before using them. Therefore, when was the research carried? The survey was conducted during November and December of the year 2018 and the interviews were carried out from February until April of 2019. Next, a closer look to each data collection process method will be given.

5.2.1 Survey

As it has been stated, the survey questionnaire was structured and most questions predetermined. Which means that "*the researcher poses a question and the respondent has to pick up one of the pre-stated answers (e.g. in a multiple-choice manner)*" (Ghauri and Grønhaug, 2005, p.123). Only a few questions were left to give open replies, such as the names of software utilized by the organizations or the country of origin's name.

The survey was made with Google Forms, and it was composed by 14 questions, which were either multiple choice questions or questions with a Likert scale. The questions that had multiple choices were of two kinds, on the one hand, there were questions with radio buttons (i.e. only one of the multiple replies could be chosen by the respondent), and on the other hand, there was one with check box buttons (i.e. out of the multiple possible answers, more than one could be selected). Regarding the Likert scale questions, those are set to measure attitudinal scales. This is done by presenting five response alternatives, grading from 1 to 5 (e.g. 1 meaning "very in favor" and 5 "very against") or five different scale options such as: "Totally disagree", "Disagree", "I don't know", "Agree", "Totally agree". Likert scale questions are very useful to collect quantitative measures regarding personality traits (Boone and Boone, 2012) (e.g. for this research, regarding the attitude of the personnel towards the digitalization of theaters). All the questions, except the open ones, were compulsory to reply.

After collecting all the relevant email addresses from the personnel belonging to theaters that met the required criteria, the survey was sent directly to those addresses via email. This was the chosen method because the target was very defined, and so, no publications were made in social media platforms, in order to avoid untargeted people taking part in the survey. The survey was sent to more than hundred contacts all around Europe, but the final sample resulted in 53 replies. The contacts where collected through a thorough research on theaters' webpages and available address lists. The minimum goal was set to be 50 replies. Nevertheless, there was a problem that could not be overcome, but this matter will be addressed together with the other limitations.

To see the questionnaire of the survey, see Appendix 1.

5.2.2 Interview

The interview's questions were kept as similar as possible to the ones in the survey. However, in order to gain deeper knowledge and give more space to the interviewee to express himself/herself, those were all presented as open questions (Ghauri and Grønhaug, 2005). This was done to observe whether the collected replies were also similar when the answers were not predetermined by the researcher.

The interview's questionnaire was a set of 13 questions and some were composed by several sub-questions (in this case, most of them where follow-up questions to get more detailed replies, such as: "why?", "how?" …). Nevertheless, there were cases in which the interviewee would reply to several questions within the same answer. Because of that, and despite having a structured questionnaire, in some cases additional questions were added, in order to get a clearer meaning of the replies or to ask the interviewee to express in more detail a specific opinion given in his/her answer.

Additionally, the interviews were not addressed to the same contacts that had replied to the survey, as the goal was to use both data collection methods as separate instruments to get to know how theaters are dealing with digitalization. Therefore, 67 contacts were left out from the survey request, and were contacted for the interview request. The interviews were carried out in real time, either face-to-face or by using online videocall tools (e.g. Skype), meaning that the interviewer would read the questions to the interviewee and he/she would reply straight away. The goal was to achieve 5 interviews, but despite several attempts, only 4 people agreed to be interviewed. The interviews lasted between 20 and 50 minutes and they were recorded and transcribed, for later analysis.

To see the questionnaire of the interview, see Appendix 2.

5.3 Research limitations

There are several limitations to be taken into account when analyzing the collected data. In the first place, the study presented is just exploratory, as the gathered sample size is too small to properly test any hypothesis. Nevertheless, it does provide potential possible hypothesis to be tested in further research. Additionally, no sophisticated statistical

approach could be taken, for example, deeply compare the differences between countries, due to the small sample sizes collected from each country.

Furthermore, the study is limited only to European countries, but it has been treated as a whole and not by properly addressing each country individually. In this manner, an obvious limitation is the fact that the survey and interviews have been conducted mostly in English, except in one case, which has been translated into Spanish. This might be the reason why the Spanish sample is bigger compared to the amount of replies gathered from other countries. Hence, this proves the existence of a language barrier for this kind of research.

When using web-based surveys, Wyatt (2000) pinpoints two mayor disadvantages that can be translated into limitations for this research. On the one hand, there is a generality limitation, as the survey was only available for those people whose email could be found by the researcher and for those who, indeed, have an email. This information is not always easy to retrieve, therefore, many people that could have been included into the sample remain unreachable. On the other hand, the validity of the results might be affected. This is because not everyone may understand the topic or certain questions – the chances for this might have increased for this research, as the survey is not presented in the mother tongue of most respondents. Additionally, the validity of the results collected with an online survey can also be threatened if someone replies to the survey multiple times or does not give honest answers.

Besides, another constrain when sending out the survey request via email, and which posed a great limitation, was that several email addresses reported an error. That is, hundreds of potential respondents were unable to receive the email to complete the survey. Unfortunately, a solution for this error could not be found. Furthermore, as previously stated, the fact that the target was so specific also limited the choices for sharing the survey in platforms with broader reach.

There were also a few limitations regarding the interviews. For example, in face-to-face interviews it is easier to get biased replies, as the interviewer (consciously or unconsciously) can affect the interviewee's replies. Nevertheless, the biggest limitation in this research regarding the interviews was the lack of willingness to participate. This might have been for several reasons, for example, because those months are usually busy times in theaters, which makes hard to find a spot for an interview; because of the language barrier (i.e. interview conducted in English); or because people's wrong interpretation of the message and didn't thought of themselves as the right target.

Finally, a last limitation to bear in mind is the fact that this research is quite novel, meaning that there is not much previous research conducted, in order to be able to compare the concluding results. As such, the approach might have been very broad and the used terminology not the most convenient one. As one respondent highlighted: "*Digitalization is inevitable but the word is very broad - we use digital technology to make a moving light work and we use digital technology to make a spread sheet. The former cannot exist without technology the latter can be achieved with a pen and paper. We use a digital platform for our work, just as writing changed the work platform when it was introduced millennia ago. As such the question is too broad to be meaningful and consequently it is hard to answer the questions and I am sure hard to frame them*". This is an important issue to consider for future researches, where the topic should be more defined.

6 DATA ANALYSIS AND EVALUATION

In this chapter, the data collected through the survey and interviews will be analyzed. The analysis will be divided by question themes (i.e. the data will be presented and analyzed by grouping different questions that address the same topic). Thus, for each question theme, first the data collected through the survey will be analyzed and then, a more extensive analysis will be carried along with the more elaborated comments gathered in the interviews. Additionally, graphics will be presented, in order to easily visualize the examined data. In the next chapter, those results will be classified by the presented research questions and further discussed in comparison with the previously introduced literature review. Hence, the combination of this two chapters will allow to derive theories and reasons for the digitalization phenomena in theater industry.

An important aspect of the analysis part is the fact that all the data collected will be presented in an anonymous manner. Furthermore, the results gathered from this sample will be generalized to the population, but it is important to keep in mind that this study was conducted through the analysis of the subjective experiences of the respondents, which can change over time.

The tool used to analyze the data has been Microsoft Excel by imputing the collected data through the survey in a table on a spreadsheet and examining each variable. Moreover, through the use of pivot tables different variables could be combined for a collective analysis. Eventually, the resulting information would be converted into graphics, as graphics offer different visualizations, in which further information can also be observed, which might not have been noticeable in a table. Yet, depending on the required examination, the subsequent data will be presented either in tables or graphics.

6.1 Study sample

As it has been previously stated, the study sample for this research consists of 53 survey respondents and 4 interviewees. However, the data collected will be presented separately. The reason is that, as it has been stated, the interview method was used to get deeper thoughts, hence, the results gathered couldn't be combined with those of the survey for its proper analysis. For this very reason, the graphics and tables will be referring only to the survey results, and then the additional opinions gathered in the interviews will be quoted, in order to achieve additional insights on the topic. Therefore, first, a basic analysis of the study sample will be presented.

The sample that took part in the survey is presented in Figure 7:

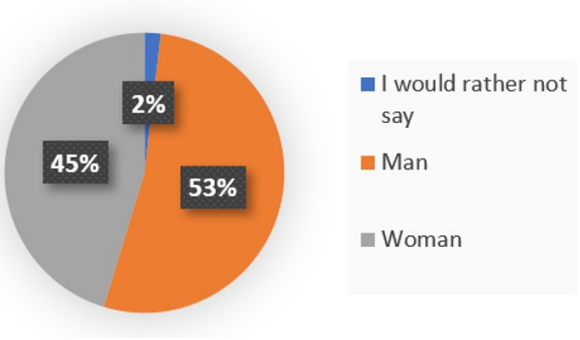

Figure 7: Gender

As it can be seen in the Figure 7, the gender variable is quite balanced, 53% of the respondents were men and 45% were women – only one person preferred not to state it. There was also the option for "other", which was not chosen in any case. Regarding age, 62% were between 30 and 50 years old, 34% between 50 and 70, and 4% between 18 and 30. There were no respondents younger than 18 nor older than 70 years old. Nationality varies more among the sample. It is interesting to notice that 20 people were Spanish (that is, 38%), which is the highest number of respondents belonging to the same country. One reason for this willingness to respond, as it has been mentioned in the previous chapter, could be the fact that the survey was also available in Spanish, that is in their own mother tongue. In addition to Spanish respondents, there were 9 German, 7 Finnish, 6 English, 2 Dutch, 2 Norwegian, and then one from each of the following countries: Austria, Czech Republic, France, Ireland and Sweden. The remaining 2 chose not to state their origin.

Row Labels	Count of Country:
Actor and Director	1
artistic director	1
Assistant Technical Director	1
Associated Director	1
Distributor	2
General Manager / General Director	10
Head of Human Resources and Reference for Musical Dept.	1
Head of Technical Design	1
Managerial assistant	1
Performing Rights officer	1
Personal Assistent to the Managing Director	1
Production assistant	1
Production Director / Manager	15
Production Manager	1
Programming and organization	1
Sales coordinator	1
Stage Director / Manager	6
Technical Director / Manager	6
Technical Producer	1
Grand Total	53

Table 1: Respondents' position in their organization

Moving on to the position (or title) they occupy in their organization (Table 1), amongst the respondents there were 16 Production Directors/Managers, 10 General Managers/Directors, 6 Technical Directors/Managers and 6 Stage Directors/Managers. Those were the predetermined answers and the main positions the survey was addressed to, nevertheless, there was a free text option too, as there could be many more additional positions that might be relevant as well. There was one person for each of the following additional titles: Technical Producer, Sales Coordinator, Programming and Organization, Production Assistant, Personal Assistant to the Managing Director, Performing Rights Officer, Managerial Assistant, Head of Technical Design, Head of Human Resources and

Reference for Musical Department, Associated Director, Assistant Technical Director, Artistic Director and an Actor and Director. Plus 2 Distributors.

Row Labels	Count of What is your title or position in the organization?
Below 10 people	13%
Between 10 and 30	25%
Between 30 and 50	15%
Between 50 and 100	11%
More than 100 people	36%
Grand Total	**100%**

Table 2: Size of theaters

The next variable (Table 2), the size of the theater, will be used for contrasting and deeper analysis purposes in later sections. 13% were theaters that have less than 10 employees, 25% between 10 and 30, 15% between 30 and 50, 11% between 50 and 100 and 36% have more than 100 employees. This will be important when considering the limitations theaters' size poses for acquiring digital tools.

It seemed relevant for this study to compare the variables of age and position, due to the fact that some respondents acknowledged personnel age as a limitation when dealing with digitalization. Nevertheless, there were also respondents disagreeing with this opinion. Anyway, this will be discussed more thoroughly in a later section. For now, the comparison of these two variables can be reflected in the following table (Table 3), where only the directing and managing positions have been taken into consideration, as people in such high positions are most likely to make final decisions.

Row Labels	Between 18 and 30	Between 30 and 50	Between 50 and 70	Grand Total
Actor and Director		1		1
artistic director			1	1
General Manager / General Director		6	4	10
Production Director / Manager	1	10	5	16
Stage Director / Manager		3	3	6
Technical Director / Manager		3	3	6
Grand Total	**1**	**23**	**16**	**40**

Table 3: Age vs. title

In this sample, most respondents in high positions (such as director or manager) are somewhere between 30 and 50 years old. The biggest difference is for the Production Director/Manager, where out of 16, 10 are on that same age frame. For other titles, the age range is more balanced. This shows that the vast majority of people in managing positions are over 30 years old.

Regarding the sample of the interviews, only 4 people were available and willing to be interviewed on this matter. The respondents were 3 women and 1 man. All of them over 30 years old and in managing positions, such as: Production Coordinator and Administration Department Manager (being the only person in the administration

department), Marketing Manager, Administrator and Producer (i.e. planner in the administration and production) and a Technical Director (who is responsible for all the digital and technical matters, such as: lightning, sound, automation, rigging, staging, building). It needs to be mentioned that 3 of the interviewees were from Finland and one from UK. All the interviewees are theater professionals, with deep knowledge and understanding of the industry, and who have extensive experience working in different areas of the theater sector for over 20 years.

6.2 Communication overall

This section's theme will be about the perceived communication situation, in general, within theaters. By "general" it is meant to address how the personnel conceive communication of work-related information, both within the same department and amongst different departments. For this topic, only one question (the 6th question in the survey questionnaire) will be deeply examined, plus the addition of the comments collected from the survey in relation to this topic.

The sixth question in the questionnaire was composed by another 6 sub-questions, on a 5-point Likert scale (Totally Agree, Agree, I don't know, Disagree, Totally Disagree). These 6 sub-questions where related to the communication level within the organization and the experienced use of available technological solutions.

The sub-questions were the following:

a. "I would rate the level of communication within my organization as very good."

For this question, it was interesting to discover that most respondents are divided between two opposite answers. 43% of the respondents said that they agree with the statement, however, 38% said that they disagree. 7% doesn't know, 6% totally agrees and 6% totally disagrees. Thus, we can see that in this aspect, there are very encountered opinions.

b. "There is good communication among the staff of the same department."

Nevertheless, when it comes to evaluating the communication within the same department, most respondents, 68% agrees and 11% totally agrees, that among the staff of the same department the communication is pretty good. Only 13% disagrees, 2% totally disagrees and 6% doesn't know. Therefore, the problem seems to be in the communication between different departments.

c. "No information is lost due to lack of communication."

From this question we could note a difference between the perception of two different communications: general communication and information communication, as 59% disagrees with the statement and 9% totally disagrees. Meaning that, indeed, information gets lost due to lack of communication. Yet, 21% agrees with the statement and 2% totally agrees. Also, 9% doesn't know.

d. "The staff knows where to find the correct information they need."

The fact that 55% of the respondents agree with this statement and 4% totally agrees, shows that, despite losing information, the staff is still capable to reach for the correct information. 11% of the respondents didn't know what to reply to this statement. Whereas 28% disagrees and 2% totally disagrees.

e. "I would be willing to implement a significant change that can generate benefits in the culture of my organization (e.g. in planning processes, communication processes...)."

Furthermore, this statement shows how most people agree that there is still place for improvement. 53% agrees and 26% totally agrees that they would be willing to implement significant changes to the organizational culture. Only 4% disagrees and 6% totally disagrees. And 11% doesn't know.

f. "I consider that my organization makes an efficient use of the available technological solutions."

This last statement was also interesting to analyze, as it reflects the perception these people have about the use of technological solutions available in their organizations. However, the opinions on this matter are also encountered. On the one hand, 38% agrees with the statement and 2% totally agrees. On the other hand, 34% disagrees and 17% totally disagrees. A 9% doesn't know.

When the interviewees were asked whether they considered their organization was making an efficient use of the available technological solutions, all of them agreed that their theater is not using the available means as efficiently as they could. One interviewee stated "*Good use of the solutions? No. When it comes to scheduling the productions yes, they do. But for budgeting no, for work hours no… we could do much more*", yet, that interviewee is positive and hopes that a change is going to come and that soon the organization will make better use of its solutions. Another interviewee said that "*no, we are not making the most effective use*". Furthermore, the interviewee said that they have a tool designed specifically for production planning purposes, but "*it is dependent on the information that is entered by the users*", and since many eventually stop updating or entering the information, it is no longer efficient to use it. Along with this statement, another interviewee said that one of the reasons for not being capable of using the available solutions more efficiently is because "*the information is difficult to share, it is a huge problem, people do not use email every day (technicians, for example) […]. You can develop good administration tools and information tools, but if everyone does not use it, it is not a perfect tool*". This last quote perfectly summarizes the most highlighted opinion from the interviews.

Going back to the survey data, next, a few combinations of the previously introduced variables will be shown, to deeply analyze the connection amongst them and to find out any pattern or incongruence. Just as clarification, in the next paragraphs the statement shown vertically (i.e. rows) will be refereed as "first statement" and the one shown horizontally (i.e. columns) as "second statement".

For example, in Table 4, it can be easily seen that communication is not perceived as a whole or individual and generic variable. Vertically it has been placed the first statement of "*I would rate the level of communication within my organization as very good*" and

horizontally the second statement of "*There is good communication among the staff of the same department*". Notice that while only 26 people (23+3, in the vertical Grand Total column) agree or totally agree with the first statement, 42 people (36+6, in the horizontal Grand Total row) agree or totally agree with the second statement. And from the 23 people (20+3, in the vertical Grand Total column) that either disagree or totally disagree with the first statement, only 8 (7+1, in the horizontal Grand Total row) disagree or totally disagree with the second one.

Row Labels / Agree	Disagree	I don't know	Totally agree	Totally disagree	Grand Total
Agree	18			5	23
Disagree	11	5	3	1	20
I don't know	2	2			4
Totally agree	3				3
Totally disagree	2			1	3
Grand Total	**36**	**7**	**3**	**6**	**1**	**53**

Table 4: Communication within organization vs. communication within departments

This is an important aspect to consider when a theater is thinking on the application of new communication tools and processes, or when planning on applying changes to the organization's culture. In other words, it might be that big structural changes are not really needed when considering improving the communication within a theater; simply the specific areas of communication that fail need to be modified.

The interviewees had also an opinion to share in addition to this matter. For one of the interviewees, whose theater has three major departments (administration, technical and production), the communication quality varies a lot amongst departments "*it depends where you work. If you work in administration you are seating with your computer all day long, and you know how to work with mail, and you read it, […] we mail a lot. But if you work in another department it varies a lot, we have people who don't like to read mail*". For another interviewee, the communication is average, as "*sometimes it is good, sometimes excellent and sometimes very poor*". However, considering that the organization of the latter interviewee is pretty large (over 400 people in all departments, plus different additional businesses within the theater), this interviewee admitted that overall "*the communication is pretty good, but it could be better*".

In Table 5, vertically we have the statement of "*No information is lost due to lack of communication*" and horizontally the statement of "*The staff knows where to find the correct information they need*". For the first statement, most people (31+5 = 36, in the Grand Total column) agree that information does get lost, however, tables turn with the second statement, as most people agree that even if information gets lost, the staff knows where to find it. Yet, 16 (15+1, in the Grand Total row) people disagree or totally disagree with the second statement, out of which 15 totally disagree or disagree with the first statement too (the missing person stated "I don't know" to the first statement).

Row Labels	Agree	Disagree	I don't know	Totally agree	Totally disagree	Grand Total
Agree	8		3			11
Disagree	15	12	2	2		31
I don't know	4	1				5
Totally agree			1			1
Totally disagree	2	2			1	5
Grand Total	**29**	**15**	**6**	**2**	**1**	**53**

Table 5: Information loss vs. information search

Nevertheless, new questions arise from the fact that people do know where to find the lost information: how can the staff find the missing information? Do they have any specific process or is it by calling or emailing the person responsible of the matter? In the latter case, the process should not be considered efficient nor optimal. As some of the interviewees admitted, they get quite many calls and emails from personnel asking for things; moreover, they need to be on top of some people in matters of communication, even when the information has been provided or published. Thus, this task of having to repeat information that is already available is taking time from their actual work.

Another interviewee said that "*information is there, if they want to have it. And if it is not there you can ask why it is not there. We try to update it all the time*". This same interviewee also admitted that they still distribute paper plans, that when it comes to communication of important information "*it is still the easiest way*". Another interviewee affirmed that they "a*lso have meetings and everyone has access to computers…*", thus, the information always gets shared. In relation to the loss of information, another interviewee replied that "*I don't think we lose information. Sometimes the wrong information gets shared. […] People know where the information is, but what is complex about that is that when you try to change the system of sharing information, people still go looking for information to the places where they used to look in*".

In the next table, Table 6, the statement of "*I would rate the level of communication within my organization as very good*" can be found vertically and the statement of "*No information is lost due to lack of communication*" horizontally. Again, it is an interesting comparison the one done between these two statements. One may think that these two statements are correlative. That is, that people agreeing with the first statement would systematically agree with the second one as well. Nonetheless, from the 26 people (23+3, in the Grand Total column) that agree or totally agree with the first statement, only 9 agree with the second one. While in comparison with the number of people that either disagree or totally disagree with the first statement, which are 23 people (20+3, in the Grand Total column), 22 also disagree or totally disagree with the second one. Thus, the correlation can only be found in the negative case.

Additionally, there is also one unusual exception. Someone that disagreed with the first statement (i.e. the level of communication within his/her organization is not rated as very good), totally agreed with the second one (i.e. information does not get lost due to bad communication). This means that despite having bad communication in the organization overall, information does not get lost due to it. Nevertheless, this could also have been a misinterpretation of the second question, as it is a quite rare situation.

Row Labels	Agree	Disagree	I don't know	Totally agree	Totally disagree	Grand Total
Agree	9	11	3			23
Disagree		17		1	2	20
I don't know	1	3				4
Totally agree	1		2			3
Totally disagree					3	3
Grand Total	**11**	**31**	**5**	**1**	**5**	**53**

Table 6: Communication within organization vs. information loss

This shows how people have different understanding for "communication" within the work environment. On the one hand, there is the work-related communication, where relevant information gets shared. On the other hand, the friendly or social communication. Furthermore, one interviewee showed this way of communication understanding very clearly, as stated when speaking about the communication: "*on a personal level, it has been very good. On a scale 1 to 10 it would be 8, 9 and 10. But in information sharing and finding and who needs what and when, that seems to be always a problem. That's the thing people complain the most about. It is a question of people not knowing what information they need, when they needed it or where to find it. […] People may feel that information is kept from them*".

To conclude with this theme, here it is one interesting thought shared by one of the interviewees: "*there is a piece of communication around digitalization and change management, which is really important: you need to take everyone on the journey with you, or it doesn't work. And there have to be clear milestones where you go, so in this day you will do this rather than what you used to do […]. And it has to be global, because if people continue to use an old system, they continue to draw resources towards that old system and constantly fights the new system, if the new system follows what is going on, then this will prevail. Which is scary*". Summing up, all the interviewed people agreed that, to some extent, the sharing of information is a problem in all the theaters.

6.3 Digitalization overall

In this section, the theme is the perception of digitalization on an overall level. For this, 3 questions of the survey will be analyzed, as well as combined with previous variables, in order to reach futher understanding and discover diverse patterns.

The first question of this section is the 7th in the survey questionnaire: "*In your opinion, how are theaters dealing with digitalization overall*?". These were the predetermined given choices to reply: "*a.They are very far behind. There are many challenges in theater when it comes to technology"; "b.They are doing just fine"; "c.They are implementing many state-of-the-art technologies, they are dealing very well"; "d.They are definitely in the forefront of digitalization!"; "e.I don't know"*. In Figure 8 the total number of replies given for each option can be appreciated.

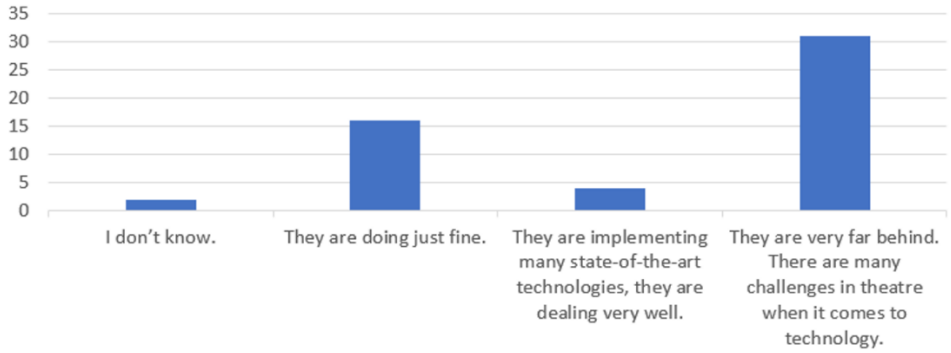

Figure 8: How are theaters dealing with digitalization?

The first thing that can be noticed is the fact that there are only 4 answers out of the 5 options given. No one is ranking theater as an industry in the forefront of digitalization. 2 people stated that they didn't know how theaters are dealing with digitalization and in 4 people's opinion they are implementing many state-of-the-art technologies. According to 16 theaters are doing just fine. However, most people, 31 to be exact, admit that, to their judgement, theaters are very far behind in terms of digitalization.

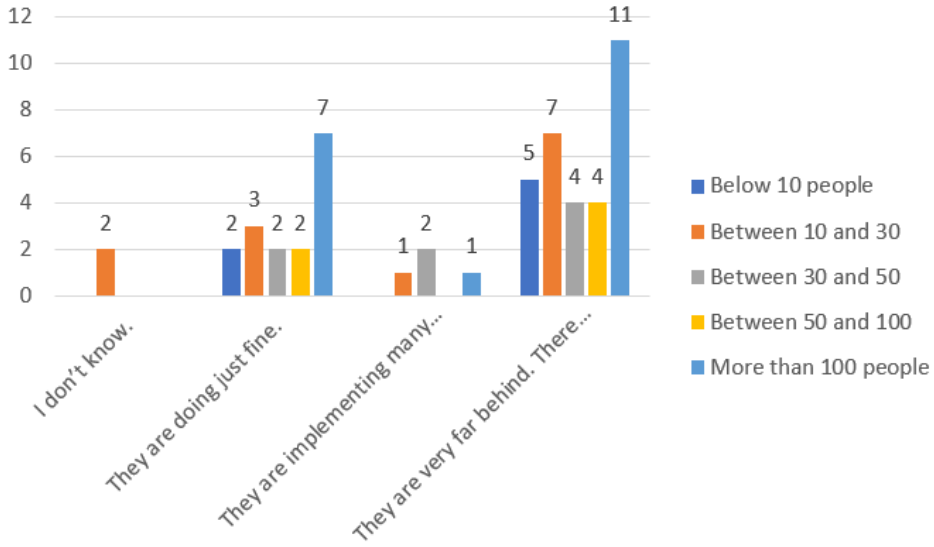

Figure 9: How theaters are dealing with digitalization vs. theaters' size

In the above graphic (Figure 9), the previous graphic's answers have been classified by theater's size. The aim of this comparison is to see whether there is any interdependence between the size of the theater and its perception on how theaters in general are dealing with digitalization. Are smaller theaters more likely to feel that theaters "*are doing just fine*"? So far, as it can be appreciated in the graphic, that assumption does not match with the reality, as opinions are quite divided regardless the theater size. In fact, no matter the size of the theater, the most chosen reply for all sizes has been "*They are very far behind. There are many challenges in theater when it comes to technology*". As one interviewee

said "*for what I gather, lots of people are in the same boat. We are in a quite good position, but others are a little behind.*"

The next question to be analyzed in this section is question 8: "*Are you in favor or against digitalization in the work environment*?". This question was presented as a Likert scale of 5 points, where 1 meant "*Very in favor*" and 5 "*Very against*". Following is the graphic with the collected replies:

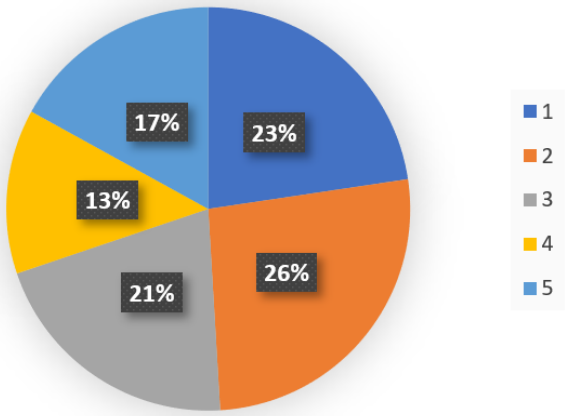

Figure 10: In favor or against digitalization?

49% of the respondents are in the "in favor" side of the scale (i.e. 1 and 2), whereas 30% are located in the "against" side of the scale (i.e. 4 and 5). And 21% are in "middle ground". When the interviewees were asked about this, these were their replies: "*it's like heaven compared to how it was before, better than paper […]. It is part of my position to plan the digitalization of the house. It does interest me because it would be much easier to get things done here with the right tools*." (consider that when this interviewee started working in theaters, they were using typing machines); "*Yes, certainly. I hope we will be using more tools*"; "*I am definitely in favor*" and "*totally, I am obsessed*".

Nevertheless, the most interesting information can be discovered when comparing this question with other variables, in order to find different patterns and be able to reason different assumptions. For example, one of the beliefs that was brought in some of the interviews, is that older people are not as much in favor of digitalization as younger people are. Hence, the next graphic aims to compare the results gathered from the survey in the questions "*Are you in favor or against digitalization in the work environment?*" and the variable of "*Age*", in order to analyze whether this assumption relates with the reality.

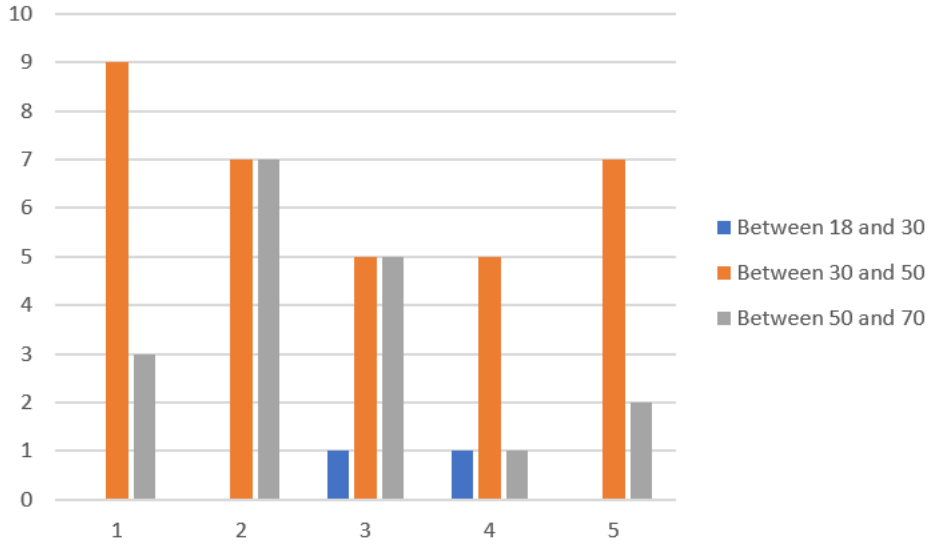

Figure 11: In favor/against digitalization vs. age

However, Figure 11, shows that the majority of the people over 50 years old is, in fact, towards favoring digitalization. To be more exact, 83,33% of the people over 50 years old has replied either 1, 2 or 3. Remember that 1 is in favor and 5 is against. Yet, people between 30 and 50 years old seem to be more evenly divided based on their opinions. Even if the tendency is towards being in favor of digitalization, 36% seem to be against it. Unfortunately, in the sample there were not so many young people (i.e. between 18 and 30 years old), thus, the tendency in this case cannot be properly analyzed. However, the two people in this age range that did reply to the survey chose 3 and a 4, which places them towards being against.

As it has been said, this assumption aroused from the conducted interviews, but here, there were also encountered opinions towards this assumption. While some see the age as the main reason for not being in favor of digitalization, others disagree. For example, in one interviewee's opinion, it is not about age, but about "*personality, willing to learn new things*". This contradictory opinion arises from the fact that the interviewee has worked for organizations that were far behind and for others that had taken a huge step forward (like no papers in the office). Hence, according to this interviewee it "*depends on the administration, that's where it starts from […]. Depends on the personnel and how people in general deal with digitalization"*. Opposite to this, another interviewee commented that "*depends who you are, depends on the activity, age, etc. […] My sons know much more, better ways to communicate with each other than me*". This issue will be brought back when speaking about the perceived challenges to overcome.

Another assumption is that northern and central European countries are more in the forefront of digitalization than south European countries. Figure 12 will reveal whether this assumption is close to the reality or not.

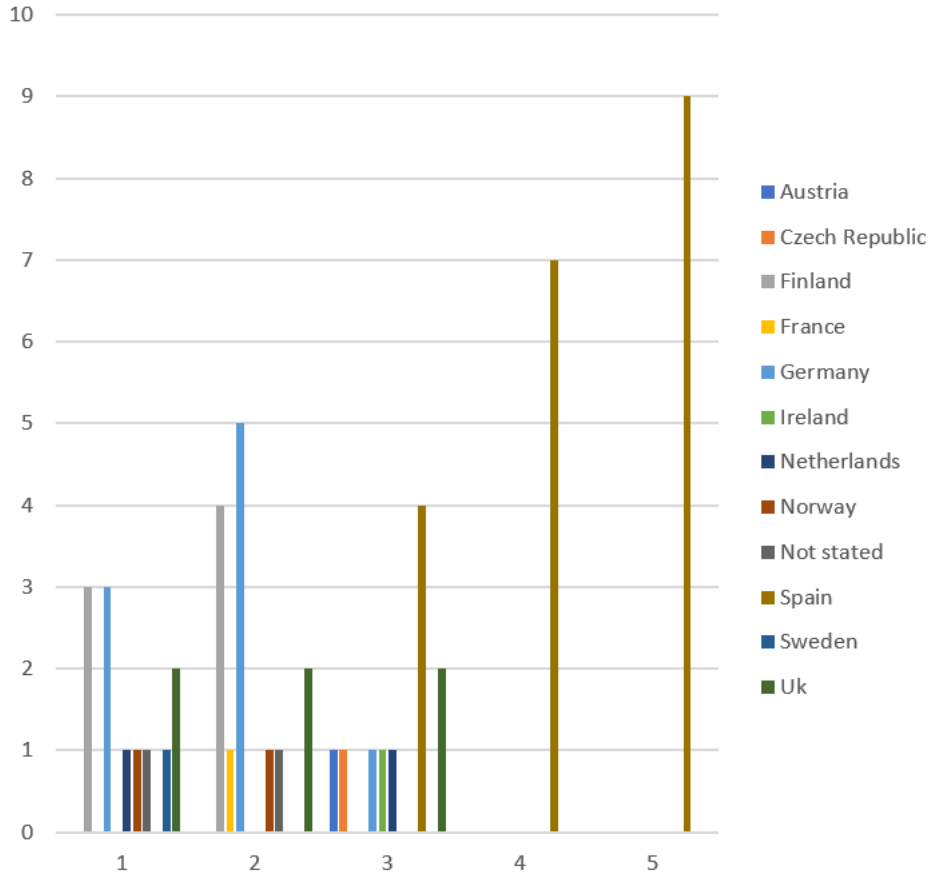

Figure 12: In favor/against digitalization vs. country

As it can be seen in Figure 12, the assumption seems to be quite accurate, as the only southern country (i.e. Spain) is the one that stands out for being the only one choosing the options against digitalization (i.e. 4 and 5). In the middle there are 4 Spanish theaters as well, together with 2 theaters from UK, 1 from Netherlands, 1 from Ireland, 1 from Germany, 1 from Czech Republic and 1 from Austria. Regarding the countries that appear to be most in favor of digitalization (i.e. 1 and 2), all the Nordic countries are in this end. There are 7 Finnish theaters, 1 Swedish, 2 Norwegian, 8 German, 1 Dutch, 4 British,1 French and 2 not stated. In addition, one interviewee addressed this matter and stated that "*in Europe they are more progressive, there seems to be more funding […]. For British theaters it is a challenging environment, there is not a lot of money to digitalize*".

Thus, the assumption is pretty close to the reality. However, it is important to remember that the sample of this study for each country is too small to generalize the results to the whole population.

The last assumption that seemed relevant to investigate was to examine if a theater's size had any effect on whether the theater is favoring digitalization or not. For this purpose, once again, the variable "*In favor/against digitalization*" was compared with the variable "*theater size*" (Figure 13). Nonetheless, no strong nor evident correlation has been found, as opinions seem to be different, regardless the theater's size. Yet, a weak correlation can be noticed, as 6 out of 7 theaters with less than 10 people are against digitalization (i.e. 4 and 5) and 12 out of 19 theaters with more than 100 people are in favor. Thus, this could

also be interesting to be taken into further research to properly examine if there is indeed a correlation.

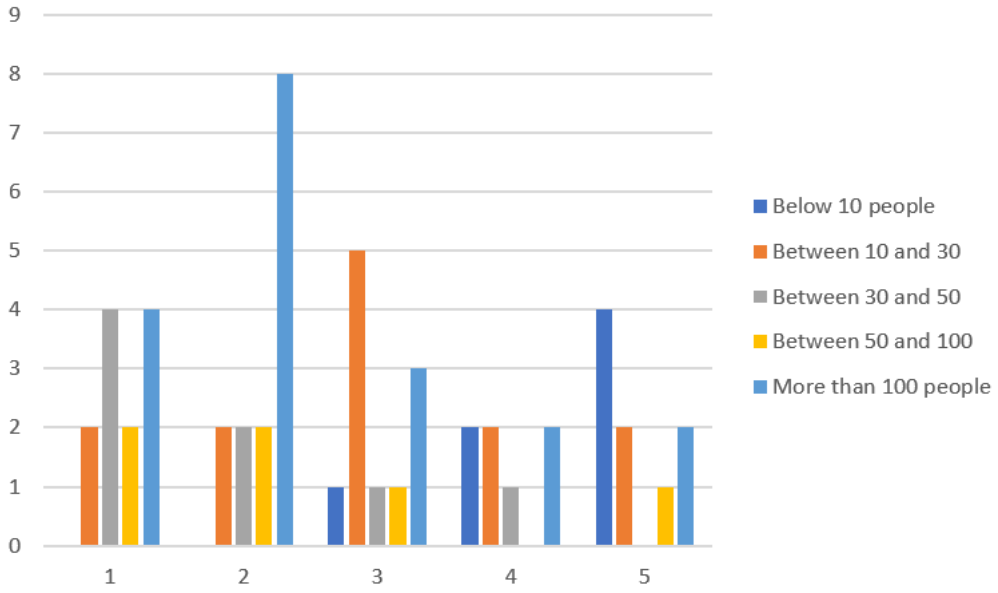

Figure 13: In favor/against digitalization vs. theater size

Additionally, another interesting discovery that was perceived by comparing different variables (i.e. there was no previous assumption on this matter) is shown in the Table 7.

Row Labels	1	2	3	4	5	Grand Total
I don't know.	1		1			2
They are doing just fine.	1	5	6		4	16
They are implementing many state-of-the-art technologies, they are dealing very well.	1	3				4
They are very far behind. There are many challenges in theatre when it comes to technology.	9	6	4	7	5	31
Grand Total	**12**	**14**	**11**	**7**	**9**	**53**

Table 7: How are theaters dealing with digitalization vs. in favor/against digitalization

By comparing the questions "*Are you in favor or against digitalization in the work environment?*" and "*In your opinion, how are theaters dealing with digitalization overall?*" it can be devised that 12 out of 16 people that placed themselves as being against digitalization (i.e. 4 and 5) stated that "*theaters are very far behind. There are many challenges in theater when it comes to technology*". This statement seems to be contradictory for people that had placed themselves against digitalization, as this would mean an increase of digital technologies.

Anyhow, this might be an indicator that one person might have several opinions related to digitalization; on the one hand, he/she could be against some aspects of it (e.g. overuse of digital technologies in theater, to the point where they are afraid of losing the tradition), but on the other hand, feel that theaters are not using all its potential. Furthermore, this could also explain why there is no correlation between being in favor or against digitalization and theater's size.

Finally, the last question to be analyzed regarding this topic is the 12th question: "*To what extent do you agree or disagree with the following statements?*". Three different statements were given for the respondent to evaluate: "*a. I feel there is a need of digitalization in the production planning process to better manage the information, with the adoption of tools specifically developed for this purpose.*", "*b. I think that centralizing the planning process would help to improve efficiency (e.g. by improving communication, decreasing human errors...).*" and "*c. I would be willing to learn how to make use of new technologies to better plan the productions and coordinate the staff.*". The given choices to reply were presented as a 5-points Likert scale: "*Totally agree*", "*Agree*", "*I don't know*", "*Disagree*" *and* "*Totally disagree*".

When analyzing this question, the three statements have been compared with the theater's size. The reason for doing so, is the fact that as it has been previously shown, no evident correlation was found between the variables of favoring digitalization and theater's size. However, these statements get slightly more into the details of which matters of digitalization the study is focused on, thus, the comparison with the size in this case might bring further insights.

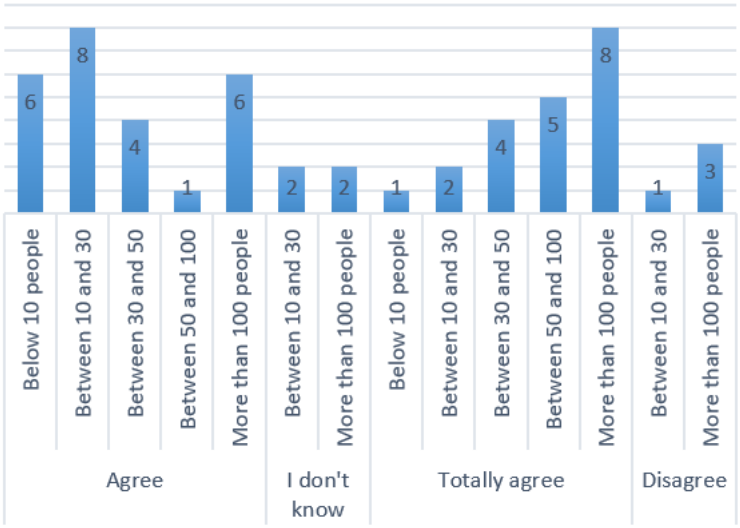

Figure 14: I feel there is a need of digitalization in the production planning process to better manage the information, with the adoption of tools specifically developed for this purpose.

Figure 14 shows the replies given to the statement a. This question presented the chance to grade how interested theaters are in utilizing digital tools in the production planning process that are developed specifically for that purpose. As it can be seen in the graphic, 45 out of 53 (i.e. 85%) respondents either totally agree or agree with it. 4 respondents do not know and only 4 respondents disagree with it. Surprisingly, 3 out of those 4 respondents that disagree work in theaters with more than 100 people and the remaining one, in a theater that has between 10 and 30 people. There is none that totally disagrees. So far, there is no apparent interconnection either between theater's size and need of digitalization.

Regarding the interviewees, all of them agree on the need for a tool specifically developed for production planning processes, "*it is not a need, it is a responsibility*". One of them

states that "*the only tool that has to be specifically developed for theater is the planning tool. Communication tools such as WhatsApp, email…they will do fine, no need to develop new ones*" and another interviewee complains about the irony of having "*more responsibility when spending public money to be more efficient, but yet, we do not have the money to invest in the version of a superefficient planning tool. […] Inefficient organizations that are not cash rich, will always be inefficient. Until someone breaks the mold*". Anyway, in another interviewee's opinion, the better management of information "*depends in a lot of things. It is obvious that a production planning software is not enough, we need more tools*".

Table 8 shows a comparison of these two previous variables. Vertically the variable of "*In favor/against digitalization*" can be found, and horizontally (i.e. the columns) the variable of "*feeling a need of digitalization in the production planning process*". The surprising and contradictory finding in this table is the fact that from all the people that have stated being against digitalization (i.e. 4 or 5) all of them except one, either agree or totally agree with feeling that there is a need for digitizing the production planning process to better manage the information, with the adoption of tools specifically developed for this purpose. The one exception chose "*I don't know*", which does not position the respondent as not feeling the need for digitizing the planning process. As a matter of fact, from the 4 people that disagree with the statement, 3 are in favor of digitalization.

Row Labels	Agree	I don't know	Totally agree	Disagree	Grand Total
1	3	1	8		12
2	6	1	4	3	14
3	7	1	2	1	11
4	4	1	2		7
5	5		4		9
Grand Total	**25**	**4**	**20**	**4**	**53**

Table 8: In favor/against digitalization vs. feeling a need of digitalization in the production planning process

Moving on to the replies given to statement b, which indicate whether respondents perceive that centralizing the planning process increases efficiency. Those replies are shown in Figure 15:

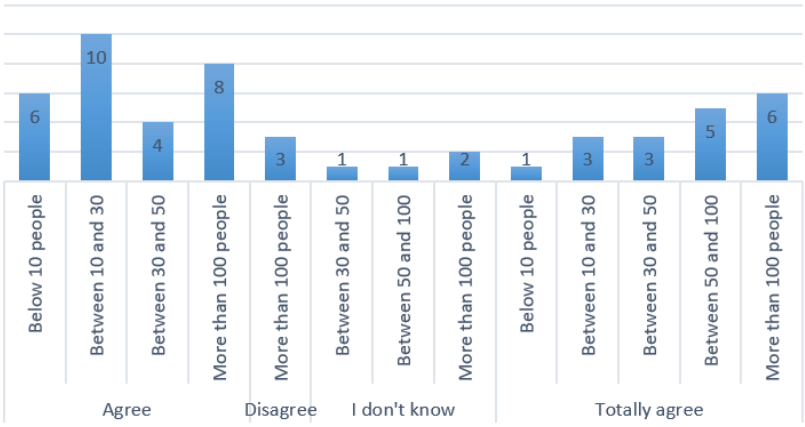

Figure 15: I think that centralizing the planning process would help to improve efficiency (e.g. by improving communication, decreasing human errors...)

When it comes to the perception of the benefits that centralizing the planning process could bring to the theater, 46 out of 53 respondents (i.e. 87%) either totally agree or agree with the fact that digitalization does improve efficiency, 4 people do not know and only 3 people from a big theater (i.e. with more than 100 people) disagree. Interestingly, from those 3 people that do not agree, only 2 are the same ones that disagreed with the previous statement too. There is none that totally disagrees with the statement.

About this statement, all the interviewees agree that centralizing the planning process does improve efficiency, as it brings several benefits, such as allowing "*team work on the same platform*", better "*communication and saving space*" and helps to "*make better decisions*". And if the theater can be more efficient, it could help "*improve the work and life balance. Have a decent balance*".

The last statement will illustrate the willingness of the respondents to learn using new technologies, as long as it means an improvement of the planning process:

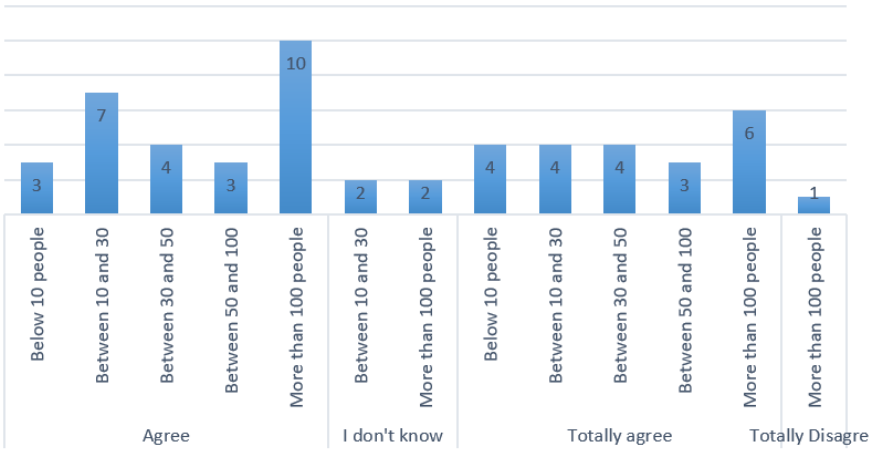

Figure 16: I would be willing to learn how to make use of new technologies to better plan the productions and coordinate the staff

Accordingly, 48 out of 53 respondents (i.e. 91%) totally agree or agree with the statement c, 4 do not know and just one respondent totally disagrees. Nevertheless, and despite not having found any more evident correlation between interest in digitalization and theater size, the fascinating finding here is the fact that while only 49% of the respondents affirmed being in favor of digitalization, 85%, 87% and 91% agreed with the statements a, b and c, accordingly; admitting the benefits that digital tools can bring to the planning process and declaring their willingness to learn how to use those. Therefore, the previously introduced supposition about one person possibly having several opinions towards digitalization gains strength. Later, the main benefits that theaters feel they get from digital technologies will be discussed in more detail.

6.4 Software use when planning

The topic in this section will be related to how theaters are utilizing software when planning their productions. Three questions will be analyzed for this purpose, to (1) understand where do theaters use most digital technology (is it at the stage or when planning?), (2) examine which kind of software solutions are the most used and (3) to acknowledge whether theaters feel the need for specific tools.

The first question to analyze is the question number 9: "*On average, how much difference is there when comparing technology use in the plays/performances vs technology use in the planning processes?*". To this question, there were 6 predetermined answers: "*a. Big difference. We use much more technology for the performances on stage than for the planning process*"; "*b. Small difference. We use just a bit more technology for the performances on stage than for the planning process*"; "*c. No difference*"; "*d. Small difference. We use just a bit more technology for the planning process than for the performances on stage*"; "*e. Big difference. We use much more technology for the planning process than for the performances on stage*"; "*f. I don't know*".

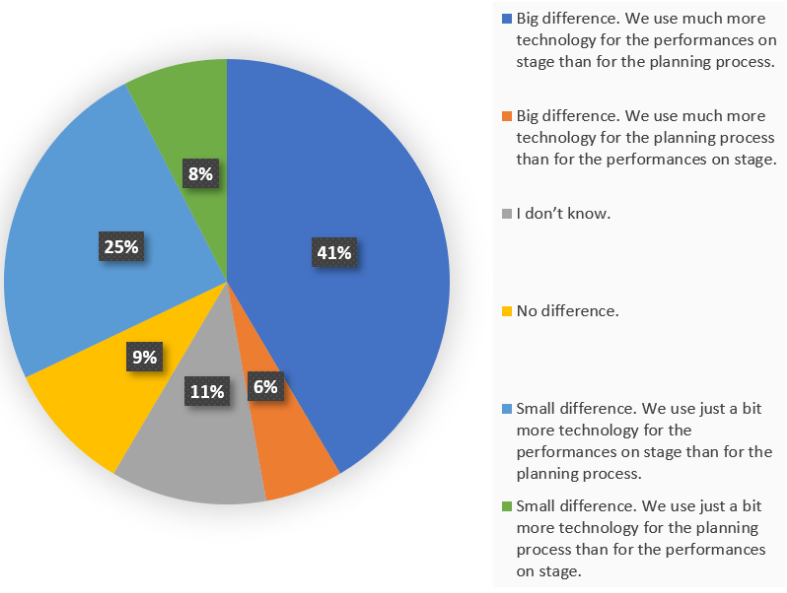

Figure 17: technology use in the plays/performances vs technology use in the planning processes

In the graphic (Figure 17) we can see that the vast majority agrees on the fact that more technology is used in the selling aspect of theater (i.e. in performances) than in the planning process. Furthermore, 41% agrees that there is a "*Big difference. We use much more technology for the performances on stage than for the planning process*" and 25% agrees that there is just a "*Small difference. We use just a bit more technology for the performances on stage than for the planning process*". 11% of the respondents didn't know what to state and 9% states there is no difference. Opposite, only 8% agrees that there is a "*Small difference. We use just a bit more technology for the planning process than for the performances on stage*" and a 6% that there is a "*Big difference. We use much more technology for the planning process than for the performances on stage*". Therefore, it can be concluded that most of the digital technology used by theaters is aimed to be adopted in the performance processes.

The second question to be analyzed is the number 10: "*What kind of software solutions are in use in your organization?*". This question was presented with multiple-choice predetermined answers, plus an open text field so that respondents could choose more than one (or none) of the given options and also add their own. The given choices were: "*a. Human Resources Software*", "*b. Payroll Software*", "*c. Ticketing Software*", "*d. Production planning Software*", "*e. ERP (Enterprise Resource Planning) Software*" and "*f. CRM (Customer Relationship Management) Software*".

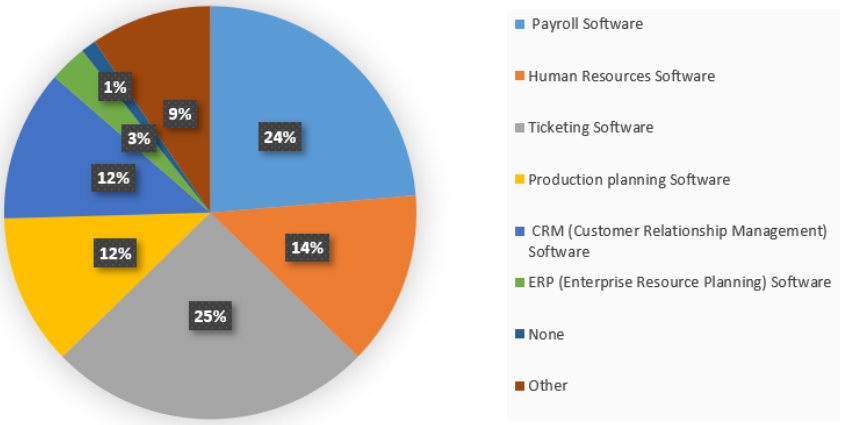

Figure 18: Software solutions used in the organizations

As it can be seen in Figure 18, that the most used software solution in theaters is Ticketing Software, as 25% of the respondents affirmed using it. The second most used solution is Payroll Software, 24% responded that they are using it. Following solutions are Human Resources Software (14%) and Production Planning Software and CRM (12% each). 9% use another kind of solutions such as: Google provided free software (e.g. Google Drive), document and resource management software, Microsoft Office package (e.g. Excel), image and video software, etc. And only 1% of the respondents do not use any kind of digital solution.

In the interviews, these are the comments gathered when asked about the additional to the above software solutions used by their organizations: "*WhatsApp, Outlook, Theatron,*

Microsoft Office package, etc. […] WhatsApp is very extended for the production department, but if something is important it is not saved anywhere. […] But we still use paper, you are back to basics at the end", "*we have the tools, we just need to use them*", "*AR glasses to provide subtitles*", "*room booking, but could be more effective. Also, a system for safety, to get statistics. Email from Google, digital calendars, Excel for budgeting […] no WhatsApp*". Apparently, Excel is very commonly used in theaters, however, a pinpointed problem with it is that "*it does not talk to other programs*".

In the next graphic, the information about the used software solutions in the surveyed organizations will be compared with the variable of theater's size.

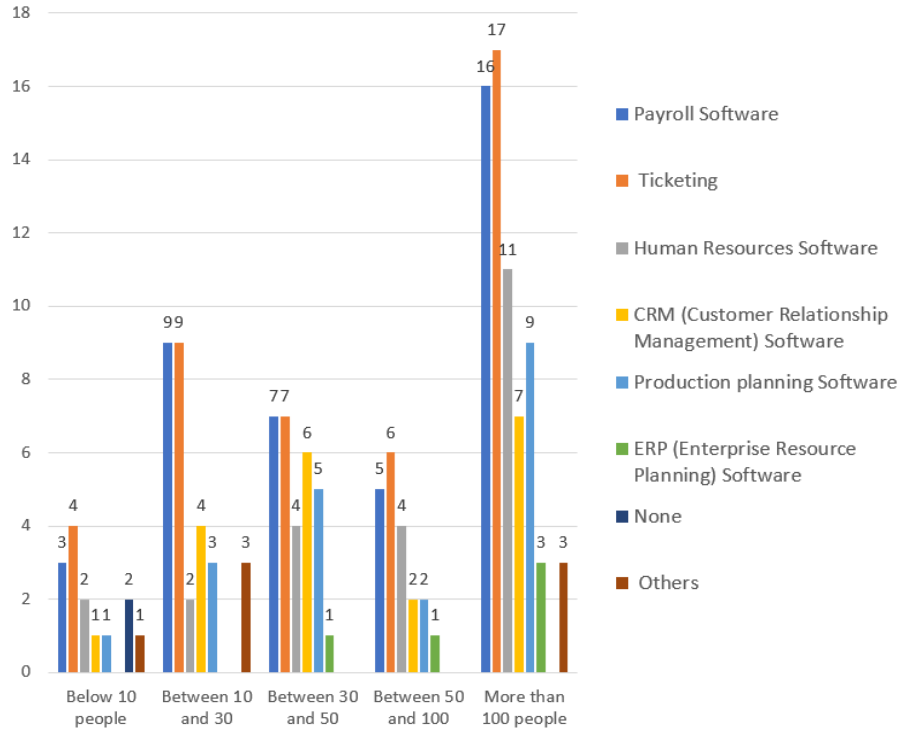

Figure 19: Software solutions used in the organizations vs. theater's size

In previous comparisons, this variable has not proven to have any strong interdependence with the digital technology usage in theaters. Nevertheless, in this case an obvious correlation between the amount of software solutions used in the organizations and their size can be noticed. On the one hand, as it can be perceived, most theaters with over 100 employees do use software solutions. The three most used software solutions are ticketing software (in fact, only 2 theaters out of the 19 theaters with more than 100 people do not use ticketing software), payroll software and human resources software. Followed by production planning software, CRM software, ERP software and others. It is outstanding that all of them use some kind of software, as there is no "*None*".

On the other hand, in the opposite end, theaters with less than 10 employees are the only ones that have stated not using any software solution (2 respondents have said "*None*"). Furthermore, in organizations with less than 10 employees the number of theaters using any kind of digital solution is far less than in those with a higher number of employed

people. In addition, another noticeable pattern is the fact that only theaters with more than 30 people appear to use ERP software.

This matter should be taken into further research, and it will be discussed in the last chapter. Yet, overall it can be concluded that ticketing and payroll software are the most popular solutions amongst theaters of any size.

The last question to be analyzed in this section is number 13th: "*Is there any tool you wish existed to help theaters with their planning processes?*". This was an open question, and respondents could write anything they wanted, or nothing at all. The wishes or comments gathered from the survey are the following: Amongst the most requested tools are budgeting and personnel management tools (e.g. "*Better budget planning suited to the needs of theater*"; "*Personnel Management Software*"; "*Availability checking freelance staff*"), tracking of inventory and made modifications, and a tool that integrates into other solutions, to be able to manage multi-projects (e.g. "*It would be nice to have a tool to help us connect information about theaters*", "*A tool to centralize every possible information around a production, form ticket sales to invoices for the plywood of the set*", "*Plan the shows in multi-project, multi-space and multi-pan. Budgeting and monitoring for several projects with different managers (in projects and items)*").

When this question was asked in the interviews, the interviewees had both similar and different wishes to the ones previously gathered through the survey. One interviewee said that the ultimate tool would be "*some kind of combination of all those channels. […] To pop up the notification full screen on people's phone, so that there is no way for them to escape from it*". Another interviewee had in mind a specific tool which already exist, but which they cannot afford to buy. The tool in the mind of this person was an automated salary program, as currently is a very manual work. A third interviewee stated that "*I have been dreaming about a budgeting program that has been designed for theaters and that it is easy to use*", and also mentioned a book keeping program and the possibility to have systems that talk to each other (i.e. "*integration of the planning solution with other tools*") with the final goal of retrieving the right information in the right time; furthermore, one of the interviewees said that if systems would talk to each other, they could also share information between organizations (e.g. about available actors/actresses): "*kind of planning together with other houses*". Finally, the last respondent had a long list in mind, some of the things mentioned were: robots ("*but not as a replacement to people*"), 3D printers, AR glasses and said that the ultimate planning tool would be one "*that allows you to move things around and model immediately what the cost-benefit would be. […] It is very important to understand also the cost implications, manage the planning together with budgeting, they need to be joined. If you change something in the plan, you need to see what is the cost of it*". But despite of knowing there are many aspects that could be improved, one of the interviewees admitted that "*yes, there are certainly things that could be done better. But overall, I am quite happy with the tools we are using currently*".

As it can be noticed, and what in the upcoming section will be addressed, theaters have multiple and very different needs, and what may work from some, do not work for others.

6.5 Challenges and advantages

This section will aim to introduce the challenges and advantages that theaters perceive from digitalization. Do theaters really have a need for digital solutions? For this intention, two last questions will be examined. First, the challenges will be addressed, then, the advantages.

The 11th question in the survey was "*What are the main struggles/challenges theaters face when it comes to digitalization?*". Several optional challenges were introduced and the respondents needed to evaluate how much each of those influence their organization's relationship with digitalization. For the evaluation of each option, a 5-points Likert scale was used: "*It has a big influence*", "*It influences to some extent*", "*I don't know*", "*It influences very little*", "*It does not influence*". The given challenges to be evaluated were the following: "*a. Money/Budgeting issues*", "*b. The lack of suitable tool(s)*", "*c. The personnel is not willing to change the old processes it is used to work with*", "*d. Lack of time to find suitable tool(s)*", "*e. The personnel lack technological skills*", "*f. Lack of training*", "*g. There are no challenges, just lack of interest*" and "*h. Others*". Each option will be analyzed individually.

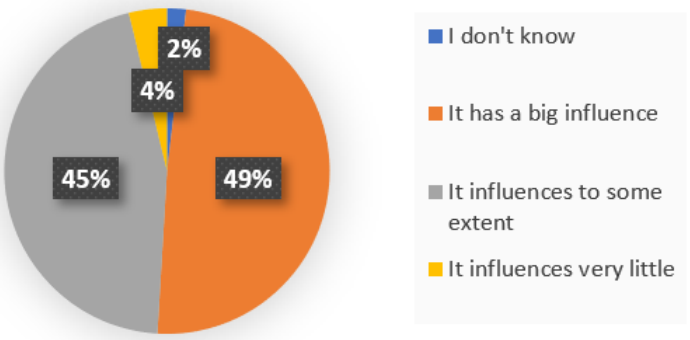

Figure 20: Money/Budgeting issues

The previous graphic (Figure 20) represents how theaters perceive that money and budgeting issues can affect the decisions towards digitalization. As it will be appreciated when introducing other challenges, this is by far the most relevant one for most theater organizations, in terms of applying digital technologies. 49% of the respondents agree that "*It has a big influence*", 45% agrees that "*It influences to some extent*", 2% does not know and only to 4% it "*influences very little*". Thus, 94% of the respondents perceive "budgeting issues" as a challenge for improving their digitalization, which makes it the main challenge recognized by theaters. None of the respondents think that "*It does not influence*".

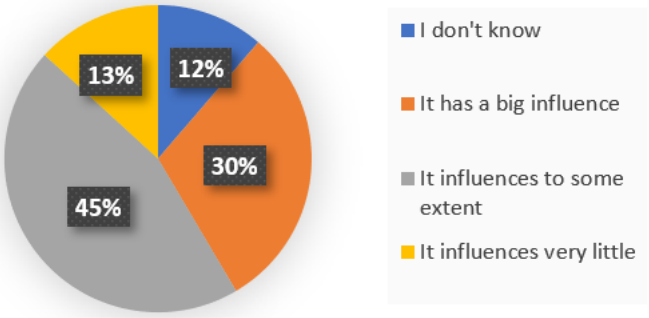

Figure 21: The lack of suitable tool(s)

The next issue to be evaluated, as shown in Figure 21, is; lacking the suitable tool(s). In this case, 30% of the respondents agrees with this being an issue. For the majority (45%), though, it just influences to some extent. 13% thinks that "*It influences very little*" and 12% does not know. Once again, no one thinks that this issue has no influence at all. The fact that 85% of the respondents agree that it either has big influence or influences to some extent, makes this issue the second main challenge that theaters face.

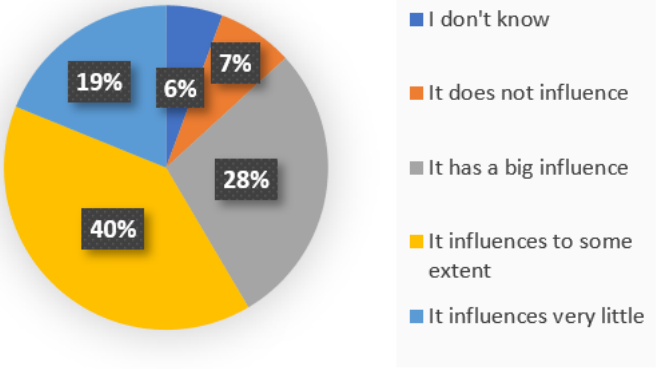

Figure 22: The personnel is not willing to change the old processes it is used to work with

Figure 22 shows the respondents' opinions on employees' willingness to change working methods or processes. This is perceived as a challenge only by 28% of the respondents. Yet, for 40% of respondents it does influence to some extent. For 19% "*It influences very little*", 6% do not know and for 7% of the respondents this matter "*does not influence*" the situation towards digitalization. As 68% of the respondents agree with this issue, its position is the sixth in the list of the main challenges. In addition, one of the interviewees addressed this as an important challenge to overcome: "*They have been working since 1970s and they were not using computers then, so they think they can still work the same way now*".

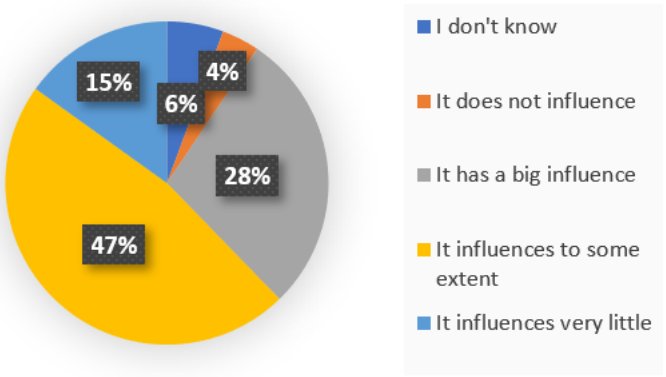

Figure 23: Lack of time to find suitable tool(s)

28% of the respondents affirm that having little time to search for suitable digital solutions has a big influence in their position towards digitalization, as shown in Figure 23. 47% agrees that "*It influences to some extent*". For 15% of the respondents it just "*influences very little*", 6% does not know and 4% says that "*It does not influence*". 75% of respondents agreeing with this issue makes it to be the third on the list of the main perceived struggles.

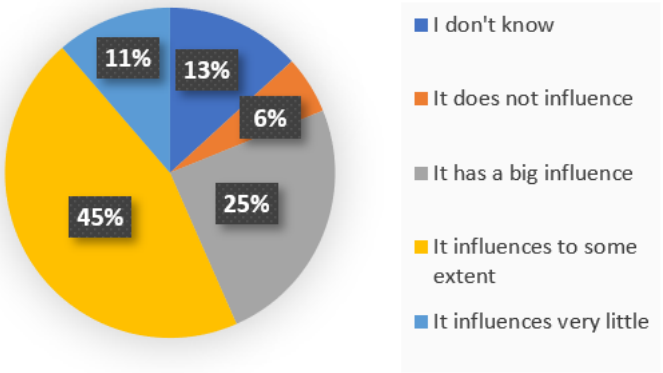

Figure 24: The personnel lack technological skills

The fact that some of the personnel may not have all the necessary technological skills or knowledge, is an issue that has a big influence for 25% of the respondents and "*It influences to some extent*" to 45% of the respondents. For 11% of respondents "*It influences very little*", 13% does not know how challenging this issue might be and 6% thinks that it has no influence at all. This is the fifth issue on the list, as 70% of the respondents agrees with it.

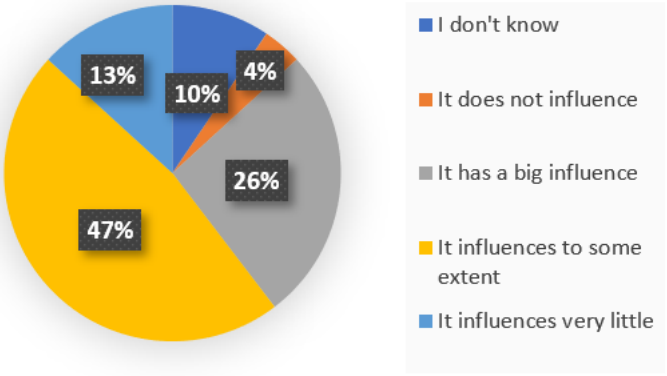

Figure 25: Lack of training

Similar to the previous issue, that lack of being able to provide proper training for the employees to use new digital solutions is perceived as a challenge for 26% of the respondents, according to figure 25. Nevertheless, 47% still thinks that is does influence to some extent. For 13% it "*It influences very little*", 10% do not know and only for 4% of the respondents this issue "*does not influence*". With a 73% of respondents agreeing, this is the fourth main challenge.

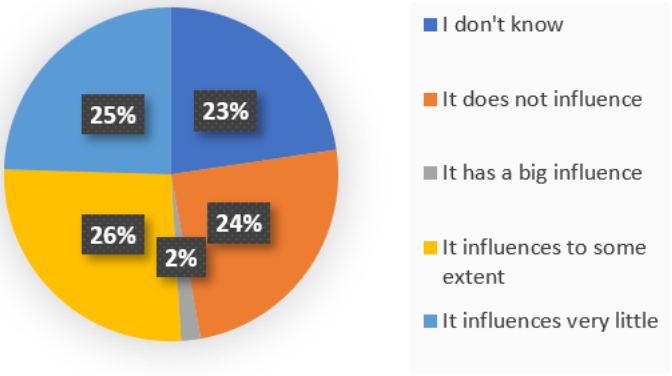

Figure 26: There are no challenges, just lack of interest

Interestingly, when asked about the fact of not being any specific challenges, just lack of interest towards digitalization, the opinions are divided pretty evenly. In this case, only 2% agrees with this fact having a big influence. 26% says that "*It influences to some extent*", 23% does not know, 25% thinks that it only influences very little and 24% says that it has no influence at all. Hence, from the predetermined list of the given challenges, this issue positions as the least influential one, with only 28% of respondents agreeing that it influences their digitalization decisions.

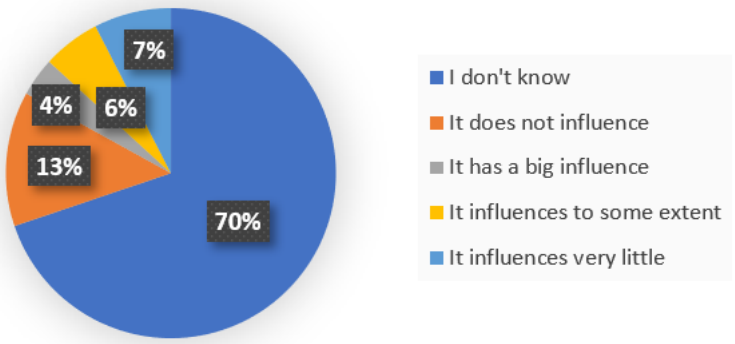

Figure 27: Other reasons

The last option given regarding the struggles theaters face when it comes to making digitalization decisions was "*Others*". Therefore, apart from the given options, 4% of the respondents think that there are other options that have a big influence as well. 6% of the respondents think that it just influences to some extent, whilst 7% affirms that other reasons only have a very little influence. For 13% of the respondents there are no other reasons that might have influence. However, the vast majority, which is a 70%, does not know whether there might be other reasons.

In relation to the challenges and struggles theaters perceive when making digitalization-related decisions, question 14th is analyzed: "*Are there any comments you want to add in relation to this topic? Any opinions that you have not been able to provide in the previous questions?*". This was the last question of the survey and it is the last question of this analysis chapter as well. This question was an open question, and the goal was to let respondents express and share their thoughts more thoroughly, as well as allow them to make any additional comments. The reason for examining this question in this section is the fact that most respondents exposed in more detail their concerns about the challenges and struggles that theaters face when it comes to digitalization matters. Following, the comments received will be listed.

For one of the respondents, the challenge "*is to find a planning tool specifically for theater productions but affordable for a relatively small organization*". In this case, there is a correlation between the size of the organization and the budgeting. As smaller organizations usually have less monetary aids. Another respondent also commented on the challenges that not having enough budget poses. In this latter case, the respondent works on a "*well-funded organization*" and the reference is about a specific tool they use for planning and the expectations they had about it: *"When we began using it, we hoped it would become the standard for the industry; however, its cost seems to have prohibited that. We still use it with great enthusiasm but we are a large and well-funded organization*". This makes evident the fact that there is, indeed, sign of a correlation between theater's size and their capabilities of applying digital solutions.

Another comment highlights the fact that theaters are not ordinary organizations; which makes it difficult to create a solution that would fit them all, which results in difficulties on finding a suitable solution. As the respondent states: "*Theaters are very different sizes*

and their working methods varies a lot. So, the needs for planning software are also very different". In addition, another respondent comments that more benefits could be gained from digitalization if it would integrate "*the perspective and experience of end users*".

The last two comments are regarding the challenges that the age and personality traits of the personnel pose when it comes to digitalization decisions. One respondent thinks that "*digitalization goes forward so quickly that you can't educate the staff at the same time. There is also a lot of old staff that has no education at all about digitalization*" and another respondent states that "*there are older and/or more conservative people that may be less inclined to use technology at the top of the organizations*". Thus, the age of the personnel is another challenge that should be added to the list.

Furthermore, in the conducted interviews, when asked about which "*are the main struggles/challenges theaters face when it comes to digitalization*" the interviewees addressed different views.

For the first interviewee, one big challenge is the lack of enough people working, because theater employees need to do a lot of work, which does not leave free time to properly look into solutions. Yet, the interviewee admits that they "*have accepted the situation; we go and ask if they have read the email and so on*".

For the second interviewee the main challenges are the age, the size of the theater and money. Also, that sometimes there might be an overload of information, for example when using WhatsApp ("*like when the members go to party*"). This interviewee stated that information sharing is always difficult, and that it is normal that if some employees are not seating with a computer all day, they are not used to check the email that often as they should, but they cannot be forced to do so: "*They are just not interested in computers*". *"It's hard to get someone do something that they don't want to […] and one can't just refuse to make papers*". In addition, the interviewee thinks that an important challenge to consider is how and when to reach people. The people in charge of sharing the information need to know how to get information to people, which means that they need to know who needs the information. And a problem with that is that each person understands words in different way: "*you read what you want to read…if you want to read!*". The irony here, however, is that when there is something nice written, for example an eye candy such as giving free tickets for a show, then everyone seems to read the information and then it is when people reacts. Anyhow, the interviewee highlighted the importance of knowing the personnel, "*you need to know how to give the information, listening is very important*" and understands that there are some people really busy, who cannot think about what is happening in three weeks ahead, so the only chance is to follow up, and not stopping with just one message.

The third interviewee presented deep thoughts on this topic and listed several challenges. Amongst those challenges one was the age, which was described as a challenge because it is the people at the top who are the oldest, and that people at the top are the ones that least understand the opportunities that technology can bring to the organization, for example, to streamline the planning processes. In this person's opinion, the older a person is, the less aware of the world it is. Therefore, it takes a lot of time to persuade those top management people. Indeed, the lack of time is also another challenged mentioned, as theater employees do not have time to do other things that what they actually are doing (create theater) and the employed language is also a big factor, as sometimes people do

not understand what digitalization of the planning process means. Budgeting was also an issue addressed: lack of "*development funding*" and the risks that financial failure can pose; quoting the interviewee's reply: "*there is too much risk in theatrical context, e.g. a financial failure, that is problematic. Theaters want to mitigate as much risk as possible and limit that risk, and it does that by sticking to fairly traditional methods, so unlike other industries perhaps it does not evolve the same way*". At the same time, that risk evasion brings additional challenges, for example, not understanding the potential of digitalization, "*because it is a traditional industry, sometimes can be a bit arrogant*", which leads to no one taking the risk of implementing more digital tools. And this, on this interviewee's mind is very problematic as the advantages of digitalization are not demonstrable "*because no one is doing it properly yet. […] We need to change the architecture of the organization, from the top-down, and make it more efficient, so that it allows us to survive in the future. Until we do that, we can't demonstrate to anyone else*". But for now, "*it doesn't matter how badly you do everything behind the scene, as long as once the audience sits down in front of it is looks believable, the rest is magic*".

The last interviewee also emphasized the challenge of people not being willing to change their processes, funding issues and time, as theaters need someone responsible for the digitalization project and it is difficult for theaters with little resources to have someone working on that full time. Even if the theater knows that it would bring savings in the long run, it is not possible. And also stressed the issue of not having enough IT knowledge: "*we often do not have IT people in the houses. […] People have been working in the houses for such long time*", thus traditional methodologies remain, as those are what they know better.

Despite underlining and acknowledging all those challenges yet to be overcome, interviewees are aware of the advantages that digitalization can bring to their organizations. For example, when asked about the benefits they perceive they could gain by using digital tools, these were the stressed ones as most important: all the personnel getting the same information, having everything centralized, the creation of archives where people can check old things and made mistakes that someone else can notice and correct. Also, securing the production and the performance, because everyone gets to know where and when they need to be, what to do and what not to do. Overall the advantages are that the whole process goes faster, as it takes less space and it is easier to share the information, which helps to maximize efficiency of schedule, as there are fewer manual processes. Eventually it would create savings and it would help to "*liberate people's minds*", who could concentrate on creating theater.

Summing up, the interviewees perceive many advantages that could be achieved with digitalization; however, they acknowledge the fact that their organizations are not making the most out of it and, therefore, the benefits are not met nor recognized. Notwithstanding, they all remain positive: "*as soon as you can demonstrate one thing, you will be able to find the funding to progress, but we need to prove the people that it will make a difference*".

6.6 Theater in the future

To finish this chapter and before moving on to the discussion, it is interesting to mention that the interviewees were very engaged with the topic discussed and they were actively

and thoroughly responding to all the questions. In some cases, the replies were taking even a broader scope than what the survey questionnaire intended. Thus, it seemed important to create a brief additional section in this chapter, in order to acknowledge those thoughts shared by some interviewees.

In fact, those beliefs that are going to be shared in this last section of the chapter are regarding how the interviewees sketch out the theater in the future. On this topic, one of the interviewees replied that it is obvious that theater is evolving, "*theaters are getting younger*". But in spite of that, the interviewee also highlighted the fact that there are "*also people that are not that old are not interested in computers*", so "*it's going to be interesting where all this lead. What happens in next 10 years. […] I hope it's going to keep its heart, which is to tell a story, and not so much about technology. […] The core in theater is so strong, I don't think it will be lost, I hope!*".

In another interviewee's mind, even if theaters are currently struggling, they have to "*overcome the challenges, but it will come slowly*". The interviewee also expects that the financial situation will improve. In this interviewee's words: "*it is great talking about digitalization, digitalization is great as a tool to help people. If you allow people the time to imagine the next future, I think that you give them capacity to learn, you give them capacity to evolve and the opportunity go on and improve things. […] As you make systems more efficient, you can use that time for something else, like not being 20 minutes entering data manually*".

In conclusion, interviewees feel intrigued and positive towards the future of theater. They are confident that digitalization will help improve not only the sales aspect of theater (i.e. what is shown on stage) but also the quality of the work of its employees.

7 DISCUSSION

In this chapter, the aim is to give answers to the research questions introduced in the introduction chapter. For this purpose, the aforementioned findings, derived from both the survey and interview methodologies employed in this study, will be discussed in more detail. Finally, supporting details and concluding theories will be presented through the combination of the analyzed data and previously gathered literature review.

At this point, it is important to remember that this study was carried out with the objective of finding how the theater industry is dealing with digitalization in the scope of production planning, rather than production staging. That is, the study is focused on the frame of digital data and information management in the backstage and throughout the planning process. Thus, as it has been stated several times throughout the thesis, this research is not focused in the digital tools utilized on stage, with the purpose of improving the final user's experience (e.g. sound and light systems).

The structure of the chapter will be as follows and it will be divided in six different sections. Each section will be representing one research question: (1) How are theaters dealing with digitalization? (2) Do theaters need to digitize their planning process? Do they feel the need? (3) Why are theaters not in the forefront of digitalization? (4) What are the challenges theaters face when it comes to digitalization? (5) How can theaters benefit from digitalization? and (6) What do theaters need from digitalization? Thus, the previously analyzed data will be addressed based on each research question's aim. After discussing the collected data, the relevant literature review will be introduced, in order to retrieve further supporting details and develop a concluding answer or finding to the questions.

7.1 How are theaters dealing with digitalization?

The first research question is, "*How are theaters dealing with digitalization?*". This research question works as an introduction to the theater industry and aims to expose how theater employees perceive their work environment is coping with digitalization. This question was also presented as such in the questionnaire. It is addressing digitalization overall. In other words, it was not framed with specific examples nor defined in an explicit manner. The reason for doing so was to not bias the respondents on thinking of a single digital solution, and to gain understanding on how digitalization is perceived in a generic level.

As it has been already described, there was a question in both the survey and interview questionnaires addressing this matter. However, deeper understanding on this was gathered through other questions as well; for example, on how the communication in the organization has been evaluated.

Therefore, based on the sample of this research, these are the conclusions deduced. No theater employee feels like the theater industry is currently in the forefront of digitalization. In some people's mind, theater is not doing bad in terms of utilizing digital tools, however, the majority of the respondents agree on the fact that the theater industry is still very far behind compared to other industries. Those opinions have been proved to meet regardless theater's size and employee's age or gender. Furthermore, when asked

about the causes leading to this situation, it is shown that theaters are facing several challenges. Those challenges will be addressed in more detail in the section 7.4 of the chapter 7.

This study shows two main opposite opinions in relation to communication within the organization. For some people, the communication within and amongst departments is perceived as very good, whilst for others it is not. These opinions, however, do not match with the perception of information loss, as most people admitted that information does get lost, despite using several solutions for this purpose. Yet, an important finding to highlight, is the fact that whereas some people perceive the general communication of their organization as poor, their feeling towards the communication between people within the same department seems positive.

Those findings are important when it comes to the application of IT management. It is essential to bear in mind that IT can be found in most of the layers and departments of an organization, indistinctive to whether it is in a strategical level, managerial or operational level (Van Grembergen et al., 2003). And as it has been already explained, IT management focuses on the internal administrative processes of IT operations (De Haes and Van Grembergen, 2009). Thus, it is of vital importance to understand how the personnel perceives and interacts with the stablished information technologies.

For example, if the employees of the theater feel that the communication within the same department is good, but when communicating with other departments information gets lost, then, special attention should be put into the communication processes between departments. The lesson here is the fact that theaters need to properly research their own needs before stablishing any major IT changes. That is, not focus solely on the assumption that the overall communication is bad, but spot where is the communication actually failing. As many researches have shown, a very common error in organizations that are looking to progress with their digitalization processes, is to center all the means on introducing new digital solutions, rather than introducing the right digital solutions (Kane et al., 2015).

Coming back to the software use, this study shows that 99% of the respondents are already using some kind of software solution. In fact, the vast majority is using more than one digital tool. This means that, to some extent, theaters are not remaining as traditional as they used to be not so long ago. In this case, the number of software solutions used by each theater correlates with the theater's size. That is, the bigger the number of people working on a theater, the more digital systems are used. Besides, it has been demonstrated that theaters have limited resources and time to acquire those tools, therefore, theater managers must ensure from the very beginning that the made IT decisions align with the strategy, values and goal of the organization (Weill and Ross, 2004).

As it has been shown in the literature review of this study, most research show the importance of IT/IS and business alignment. Furthermore, several models have been developed as a tool to provide assistance when considering the application of new technologies and as a framework to success on IT governance. Thus, theaters should take those into consideration as well. It is crucial to dispatch the idea of isolating IS and IT to solely the people using those tools. Board members as well as operational departments should be educated on the organization's IT (Henningsson and Kettinger, 2006), so that all the theater's personnel, information systems and resources are synchronized (Mithas and Lucas, 2010).

In fact, a statement found in a casebook made by the European Theater Convention reaffirms this concluding argument on how theaters should deal with digitalization. In that casebook, it is emphasized that in order to create a good digital strategy, it needs to align with where the theater is today and keep in its core the organization's creative mission. Theater's digital strategy must consider organization's unique attributes and how new digital technologies can best help reach broader objectives. Additionally, on the one hand, it is criticized that too often digitalization matters are left for the marketing department, as digitalization is perceived as a communication activity instead of as part of a modern theater's DNA. On the other hand, it is denounced that digitalization must be commanded and directed from the top (European Theater Lab, 2018).

In conclusion, in order to improve the digitalization process in theaters, managers and board members of such organizations should take more responsibility on appointing and distributing IT strategies. As well as communicating the IT decisions, so that the established information systems align with the business strategy. As one of the interviewees very well stated, the change needs to be from "*top to down*" and "*taking everyone on board*".

7.2 Do theaters need to digitize their planning process? Do they feel the need?

The second research question aimed to study whether theaters feel the need of digitizing their production planning process. Therefore, in this section this matter will be addressed, by discussing the collected replies to the question "*Are you in favor or against digitalization in the work environment?*".

There were a few interesting findings when asked whether a respondent was in favor or against digitalization. The objective of formulating this question was to discover how many people from the sample are actually supporters of digitalization. This seemed relevant because if an employee, in a personal level is not interested or does not support digitalization in a theater's work environment, then certainly that person is not going to feel a need for digitizing the production planning process. At least that was the assumption before having analyzed the data. Nonetheless, the assumption has been proved to be wrong. As it has been shown, respondents that stated being against digitalization do actually feel the need for digitizing the production planning process. Indeed, whereas only 49% of the respondents of the survey stated being in favor of digitalization, 85% of the survey respondents and 100% of the interviewees feel the need of digitizing the production planning process.

Additionally, this variable of being in favor or against digitalization was compared with the variables of age, country and theater's size. So far, and due to the limitations of the small sample, no strong and evident correlation between those variables has been found. Thus, none of the previously made assumptions have shown to reflect the reality (e.g. the assumption that it is more likely that older people are against digitalization or that bigger theaters are more likely to be in favor).

One of the reasons theaters need to digitalize their planning process is because using a digital tool would allow the employees to work in a centralized manner. Teams could work on the same platform, which would help improve efficiency. Moreover, 87% of the

surveyed people and 100% of the interviewees agree that centralizing the planning process would help to make it more efficient, as it would improve communication between teams, save space and the possibilities for making human errors would decrease.

It is already a fact that information communication processes are increasingly more dependent on IT and digital tools, due to the benefits that those have proven to supply. For example, by overcoming the obstacles of distance, time and space. Nowadays teams can work out a project even when all the members are not physically present (Coltman et al., 2015). Besides, the amount of information created, managed and used by organizations is higher than when all processes where analog and manual (Kien Sia, Soh & Weill, 2016). This overload of information has to be carefully administrated and for this reason information systems have been developed, to help the organizations to better control their resources (Oates, 2006).

Furthermore, the study has shown that the great majority of employees would be willing to learn how to make use of new technologies to better plan the productions and coordinate the staff. The fascinating thing retrieved from the analysis of the collected statements is that they do not match with the results collected when asked about being in favor or against digitalization. In fact, a new assumption has emerged from this very reason. This new assumption is about people having multiple opinions towards digitalization (e.g. in a personal level they might not be totally in favor, yet they do perceive the benefits that could be gained for the work environment).

Delone and McLean (2003) presented a model, which has been introduced as literature review for this research, that highlights the relationship between the perceived system quality, service quality and information quality by the user. Their model, thus, puts the user's experience and satisfaction in the center of the matrix. They defend that the success of an information system is evaluated by the effect that its information has on the receiver. And stress the significance of the "intention to use it". That is, whether the user utilized the solution voluntarily or is obliged.

Therefore, it is of great importance to understand how theater's employees perceive digitalization in their work environment (e.g. when do they feel against digitalization and when they would be willing to learn how to use new digital tools), as their individual satisfaction and opinion towards digitalization will have a strong impact on the information systems' overall success (Delone and McLean, 2003) and finally, on the effective management and communication of information. As stated in a case book from the European Theater Convention (ETC), which agrees with Delone's and McLean's model, effective digital strategies "*are embedded in the organization and endorsed by, and led from, the very top*" while they "*put users and audiences in the center*" (European Theater Lab, 2018, p. 13).

To sum up, it can be concluded that, as some theaters feel the need and some do not, they should think of digitizing the planning process when the need is acknowledged. Then yes, theaters need to digitize their planning processes. In fact, this study has proven obvious that theaters do feel they could get several benefits from digitalization. However, it has also been proved that theaters do have many different needs and approaches, and that there is no clear pattern that stablishes which theater needs which tool. Because of this, theaters must make their own singular evaluation of their current situation and integrate only what needs to be integrated, to abstain from unnecessary costs, reduction of value and inefficiency (Henningsson and Kettinger, 2006).

7.3 Why are theaters not in the forefront of digitalization?

First of all, it is crucial to clarify that the third research question derives from an assumption aimed to be tested. The assumption that was made was that theaters are not positioned as digitalization leaders in matters of information systems and technologies. This assumption did not come from the literature review, but from being in direct contact with the theater industry.

In order to find an answer to this suggested research question, it is important to understand where the theaters are establishing most of their digital resources, is it on the planning process or on stage? For this reason, in the survey questionnaire it was asked for the respondents to evaluate whether they feel a considerable difference between the technology used in the plays or performances, compared to the technology use in the planning processes. Hopefully, knowing where and how digital tools are utilized in this industry will help researchers and theaters themselves understand why they are not in a better position when it comes to the use of digital information systems.

The results showed that in most organization the difference is huge and that they use most of their digital resources for the performances. In fewer organizations the difference is smaller (i.e. fewer theaters only use a little bit more digital tools on stage than in the planning process). Yet, there is a very small number of organizations for which the difference is big, but because they use much more digital technology in the planning process than on stage. Thus, the conclusion derived from this question is that the assumption made regarding theaters not being in the forefront of digitalization, is pretty accurate in matters of information communication and information systems.

For further comparison, The European Theater Lab has been trailing over the years several arts and cultural organizations on how they are developing data management technologies. With that purpose, they made a "Digital Culture Survey", which "*has thrown up worrying results in some areas*". This research has been so far the only comparable reference in matters of investigating the same topics as this thesis; thus, it is important to compare and discuss whether the findings match or not. And they do, as the results derived from their survey affirm that "*since 2013 there has been a decline in the proportion of organizations that see digital technology as important to their work in areas such as creation, distribution and exhibition. The 2017 survey also shows that the majority of arts and cultural organizations still do not use data for important purposes such as understanding their audiences better through data analysis and profiling*" (European Theater Lab, 2018, p. 11). Therefore, and regardless the limitations that the small sample of this research presents, the derived conclusions seem to coordinate with the reality.

Nevertheless, coming back to the research question, in spite of most respondents stating that their organization is not making the most effective use of the digital solutions when it comes to the production planning processes. When the interviewees were asked to express their thoughts on this issue, they all agree that the situation is still better than what it was some years ago. They know that there are many things that need to be improved, but they remain positive towards the future and believe it is going to bring better practices due to digitalization.

On this subject, there is another survey that could be discussed. The European Theater Lab conducted another survey on "*How does the (digital) theater of the future look like?*". Most participants of their survey were European state funded theaters and they "*sketch out an interactive, participative and immersive theater*", yet, they agree that "*the meaningful application of digital technology is a big issue*" (Maren Dey, 2017). So, the final conclusions presented on their survey on how to overcome this issue and how to position cultural organizations such as theaters on the cutting edge of digitalization is by doing more research, reducing the cost of technological solutions and applying clear concepts (Maren Dey, 2017).

To conclude, the final thoughts on this matter are that, if the topic would have been digitalization on stage, possibly many of the surveyed theaters would have had another opinion on how theaters are positioned in the digital world, as there are many researches and articles that can be easily found on that topic (as proved in the third chapter of this thesis).

7.4 What are the challenges theaters face when it comes to digitalization?

After researching what is the situation with theaters and digitalization and whether theaters feel like they are not in the vanguard of utilizing digital solutions for the management and communication of their information, the goal was to study what are the reasons for theaters to be in this situation. Hence, the next proposed research question is regarding the struggles and challenges that theaters face when it comes to digitalizing their planning process.

In the questionnaire presented to the surveyed sample in this research, there was a question addressing this matter. The final list of the presented challenges, displayed in a scale from biggest influence to least is the following: (1) Money/Budgeting issues, (2) The lack of suitable tool(s), (3) Lack of time to find suitable tool(s), (4) Lack of training, (5) The personnel lack technological skills, (6) The personnel is not willing to change the old processes it is used to work with, (7) There are no challenges, just lack of interest and (8) Others.

Furthermore, when given the chance to respondents for further develop their thoughts on the survey topic, most of them addressed and underlined the challenges they need to face, as a reason for not being in the forefront of digitalization. On those insights shared by the respondents, they highlight the fact that theaters do not work as ordinary businesses. Moreover, they pinpoint that each theater works in different ways and, thus, have different needs. This makes very difficult the process of finding a suitable tool that fits into the needs of most performing arts organizations.

In addition, there is another challenge that has many encountered opinions. On the one hand, some people think that the age might be one of the reasons for not being more supportive towards digitalization. In their opinion, older people are not able to see the advantages that investing in digital solutions can bring to their business, and as usually those people are in management positions, the idea of applying digital tools does not have their support. Whereas, on the other hand, other people do not perceive theater's

employees' age as a challenge for not being more innovative. For these people, it is a matter of personality traits.

Looking now at the literature review, it can be concluded that the collected results do reflect the reality reflected in previous researches. As Tajtáková (2014) explains, the high financial costs of digital technologies are one of the biggest constrains that theaters need to face. And theaters that are not well funded nor earn big revenues, cannot afford to invest in tools which they do not presume indispensable. What is more, even when the tools are not expensive, there are additional costs to bear in mind, such as: the time needed for training the staff or the purchase of additional technical infrastructures (Thomson et al., 2013). Castells (2011) also highlights in his book of "*The Rise of the Network Society*" that, overall, the occupational profile requested from the employees has been enhanced due to the latest technological revolutions, as they are now required to have more skills and educational level, so that organizations can spend less resources (i.e. time and money) in their training.

Nevertheless, in the proper training of employees is where the focus should be put (Kane et al., 2015). An interesting finding of this survey is the fact that while the lack of training is perceived as the fourth main challenge by theater personnel and despite 30% of the employees appear to be against digitalization, the truth is that 91% of the respondents would be willing to learn how to make use of new technologies to better plan the productions and coordinate the staff. Indeed, theory shows that the most common reason for inefficient use of IS and unsatisfactory information management practices is a deficient approach to IT governance. Thus, if theaters want to achieve change and improve in their digitalization practices, they need to invest in the competences of its employees and build a solid business culture (Kane et al., 2015).

Theaters need to understand that in order to overcome those challenges, they need to stop looking at the digital systems as tools solely used by the IT department. They need to ditch the idea that efficient IT governance is only a responsibility for tech companies (Weill and Ross, 2004). One of the interviewees mentioned the fact that, in theater industry, no one has yet proved the benefits that digital solutions can bring to the business (mainly because no one is implementing those tools efficiently). This issue was seen as a big challenge for this person, as it means that until no one proves empirically the benefits retrieved from digitalization, managers will not perceive investments in digital solutions as a priority and, as a result, there is never budget left for purchasing those tools.

However, theaters should look at the evidence found in other industries, where digitalization has proved to bring benefits. For example, when IT is aligned with business goals and it is integrated in a manner that it supports the organization's strategy, higher profits have been achieved. In other words, if managers would take an active role in IT governance and would bring the whole organization into the process of IT management, then the most value of digital information technologies would be achieved (Weill and Ross, 2004).

All in all, there are some basic and core challenges that have to be overcome in order to move forward and continue getting over the rest of struggles. An apparent core challenge is the struggle of pursuing undefined benefits of an innovation while in the process of creating productions. The task of finding the right solution requires time, and such project

hinders the work of a theater (i.e. create productions). The European Theater Lab (2018, p.43) defines this struggle very accurately: "*if the objective of a research project is innovation, then the participants should be relieved of the pressure a production brings. Just think about large corporations that have a separate department for innovation: relieved from the pressure of making profit and therefore allowed to fail*", only then "*innovation has a chance*".

7.5 How can theaters benefit from digitalization?

The aim of this research question is to describe what are the practices theaters need to implement in order to succeed in digitalization (i.e. how they can benefit from digitalization). The resulting discussion for this research question is derived in great majority from the literature review, although it is based in the overall conclusions gathered through the data collection methods (i.e. survey and interview). The goal is to make a final collection of the best practices that theater organizations can implement.

The European Theater Convention (ETC) (2018) has been for several years involved in a project addressing and researching the relationship between theaters and digitalization. Some of these publications have been already referenced in previous sections of this chapter. In another of these publications, they introduce a collection of suggestions for publicly funded theaters which are interested in overcoming this digital challenge. This collection has originated from the experience of a two-year project the ETC was involved in. Next, their best practices suggestions are going to be described, combining them with the previously introduced theoretical frameworks, which were described in the literature review of this thesis, in order to acknowledge the link between theory and reality.

Peterson (2004) states that a prevailing mistake in organizations is that managers often withdraw from their responsibilities when it comes to IT matters. Thus, the CIO is usually solely responsible for IT governance and management. This is a mistake, as IT and IS proper management should be a task where the whole organization is involved (Weill and Ross, 2004). ETC (2018, p.6) agrees with this fact, as one of their suggestions to success in digitalization is for organizations to be open to a "*holistic change*", which means that organizations must "*recognize the use of new technologies in theater as an issue that will affect the whole value production chain*". In fact, Kane et al (2015) highlight the mistake of over focusing on stablishing new technologies and ETC (2018), in order to reduce the chances to make that mistake, recommends that theaters develop a digital policy, which involves all the personnel in the organization. The focus on stablished guidelines suitable to each theater, will help avoid the error of implementing unnecessary tools. Mithas and Lucas (2010) are also supporters of this idea and they place the executive managers as responsible for the communication of the digital strategy and synchronization of the personnel and resources.

Therefore, so that everyone is involved in the process, ETC (2018, p.7) emphasizes the importance of considering new job positions (e.g. "*digital dramaturges or digital producers*"). The goal of this personnel will be to act as intermediaries, in order to "*foster contacts, exchanges and co-working sessions from the start of the project and more generally to embed digital into the theater organizations, both as a process and as a format of creation*" (ETC, 2018, p.8). On this matter, De Haes and Van Grembergen (2009) agree that the creation of an IT strategy committee which directly reports to the

board of directors and forming an IT project steering committee are among the top 10 most important IT governance practices.

Another suggestion from the ETC (2018, p.10) is to "*invest in research and development projects without focusing on seeing results immediately*". In other words: "*time is needed: Change cannot happen overnight*" (ETC, 2018, p.7). Delone and McLean (2003) comprehend this very well, because they highlight the importance of understanding that the most value of IT comes from taking on the appropriate investments and carefully analyzing, measuring and evaluating information system's success and effectiveness. And for this, investing enough time is crucial.

Finally, ETC (2018) also advises theaters to invest in training sessions regularly. And as it has been acknowledged in this research, people perceive the lack of training as a boundary to succeed in digitalization and make effective use of the already available digital tools. Yet, the vast majority of the respondents of the survey has claimed their willingness to learn how to use new digital tools, as long as it means to achieve an improvement in the production planning and communication. Furthermore, ETC (2018) also emphasizes the value of understanding the individual needs of each theater. A suggested option to attain this could be through support surveys to the theater personnel. Petter et al. (2012) make the same recommendation in their model, making a call for the application of a digital strategy that starts from a personal level until it develops to a global level, in order to reflect the broad impact of information systems. Therefore, it can be concluded that, in matters of digitalization, the involvement of all organization is of vital importance.

7.6 What do theaters need from digitalization? (i.e. why they need it)

For this final research question, the main benefits that theaters can achieve from the digitalization of their organization will be listed. The purpose is to acknowledge why theaters need to digitalize their processes. In other words, what is it that they need to gain, in order to become more efficient. The collection of evidence that will be presented has been obtained from the literature review and several comments of the real experience of the interviewees who use digital solutions in their planning processes. Thus, in this last section, literature review facts will be matched with empirical facts.

On the one hand, the most evident benefit gained from utilizing digital tools is the fact that boundaries such as distance, time, space and function are being overcome (Coltman et al., 2015) and these factors are not seen as barriers anymore, which leads to a more efficient creation, communication and use of information (Petter, et al., 2012). In fact, 85% of the survey respondents agree that if the production planning process would be digitalized, it would help to improve the management of information – as long as the tool is specifically developed for that purpose.

Hereafter, some examples of the competitive advantages that organizations can retrieve from IS are: (1) better data gathering due to a better connection of information (e.g. systems that connect customers with providers to follow up on their orders or to improve the communication between both parties), (2) abolition of boundaries – no matter where the personnel is located, they can have access to the right information and (3) the development of more appropriate business strategies, due to a more accurate control over

the organization's activities (e.g. by analyzing the data collected though the IS, managers can decide on whether to keep or modify their current business strategy (Porter and Millar, 1985).

Another researcher agreeing with those facts and highlighting the ultimate benefits of digitalization is Castells (2011), who claims that the most evident changes will be given in the transformation of space and time, optimizing the user's experience. For example, through simultaneously carrying social practices no matter the distance, and involving everyone in the production, transference and processing of information. Additionally, the European Theater Lab (2018) emphasizes the importance of the team's involvement and the earlier inclusion of artists and technicians in all these processes, to make the work go forward more smoothly, as everybody is well informed on the matters from the beginning and less time is spent on repeating the same information all over again. Furthermore, it also generates better coordination amongst the personnel of the organization.

And last, but not least, the respondents of this study, interviewees who are currently using some kind of IS for planning purposes, corroborate those facts. The analysis has shown that theaters do feel it eases the whole planning process and that it does create savings in the long run, mostly because the whole process is streamlined, centralized and everyone gets more relevant information.

To finish, in the next chapter the general conclusions collected from this research will be presented. But it is important to remember that this study has had several significant limitations and that the primary goal was to provide new hypothesis to test in further researches. Therefore, in the next and final chapter, a section for further research has been included, in order to address those hypotheses that need to be studied in deeper detail.

8 CONCLUSIONS

The emergence of digital technology in the last decades has led to huge changes in society and in business and cultural structures. Digitalization is now embedded in most of our daily activities and life experiences. We are constantly surrounded by information, which is presented to us in any form and variations and in higher quantities than ever before (Jensen, 2007). This massive production of digital information requires the development of solutions that are capable of efficiently gathering, managing and storing such vast amounts of data. This is the reason why IT management and IT governance are high on the agenda of most organizations (De Haes and Van Grembergen, 2009). Moreover, information technologies are changing how corporations are developing their strategies. Thus, while digitalization is bringing many benefits to organizations, their strategies are growing dependent on IT (Coltman et al., 2015).

Therefore, restating the argument for this research, the focus of this study lies on the communication of information within the organization. There is a countless number of studies and researches done on this matter, as the literature review of this thesis has shown. However, when it comes to researches about how the theater industry is dealing with digitalization, all the focus is on the digital technology applied on stage. That is, digital solutions addressed to the customer experience, and not for the efficient management of the company's information. Hence, even though it seems that theaters are applying many digital tools, the truth is that most of those tools are not aimed for the efficient management and communication of information.

Consequently, the goal of this research was to provide an insight on the digitalization of theaters' organization. So far, and in spite of the previously mentioned limitations, the research has been successful in its core task. Multiple conclusions have resulted due to the combination of different resources. On the one hand, the literature review on this topic has provided a broad understanding on the matter and has presented with best practices followed by other industries, which could be applied in theater organizations. On the other hand, the empirical research carried through surveys and interviews to theater employees, has allowed a deeper understanding of the real situation theaters are facing when it comes to IT and IS.

Thereby, the resulted conclusions will be presented next in two separate lists, and then, the new developed assumptions and hypotheses to be taken into further research will be introduced in the last section. On the one hand, the overall concluding statements are listed as follows:

- **Theater employees do not perceive that their industry is positioned in the forefront of digitalization.** No one of the respondents see theaters in the best position in regards of digitalization. The overall perception is that theaters are very far behind. Yet, for some, theaters are not doing too bad either.

- **In support of digitalization.** The opinions towards being in favor or against digitalization are quite divided. However, the majority has positioned themselves as being in favor. However, no correlation between supporting digitalization and variables such as age, gender nor theater's size has been found. Additionally, even if some people stated to be against digitalization, they agree that digitizing the production planning process would help to make it more efficient.

- **Communication within the organization.** When it comes to the evaluation of information communication within the organization, it has been discovered that the opinions differ when it comes to the communication quality between departments or the communication quality within a department. Overall, the former has been graded as worse than the latter.

- **Most respondents are already using some kind of IS solution**, or more than one. Hence, theaters are not remaining as traditional as they used to be. However, for this variable a small correlation has been found with the theater's size. That is, the bigger the theater, the more digital systems are used.

- **Employees are willing to learn how to use new digital tools**, even people that had previously stated being against digitalization. This willingness remains as long as those tools help improve the planning processes.

On the other hand, the following list presents the practical implications with which this research contributes to the area of digitalization of theater information management:

- **Theaters must dispatch the idea of isolating IS and IT governance to solely the people using those tools.** Board members, managers and operational departments should all be educated on the organization's IT. In order to get all the theater's personnel, information systems and resources synchronized.

- **Take time to analyze theater's current situation.** The theater's digital strategy must consider the organization's unique attributes and deeply analyze how new digital technologies can help reach broader objectives. It needs to be a holistic change.

- **The users must be put in the center of the matrix.** There is a relationship between the service, system and information quality perceived by the user. Thus, if user's experience is not positive, the use of the system is not going to be positive either (e.g. because they do not use it efficiently or do not use it at all).

- **Top 3 challenges.** The main struggles that theaters have in order to improve their digitalization are: (1) Money/Budgeting issues, (2) The lack of suitable tool(s), (3) Lack of time to find suitable tool(s). There are two additional challenges added to that list, which do not have a set position, but that are present in all employees' minds. However, those two challenges have encountered opinions. For some people the age of the theater personnel is a big obstacle, whereas for others it is the personality traits.

- **Benefits.** Amongst the benefits that theaters can get from digitalization are: better connection for better data gathering, elimination of boundaries (time and space), greater control of the organization's activities resulting in the development of more suitable strategies, space saving, improved communication and even share of information.

- **Towards the future of theater.** Employees acknowledge that there are many challenges to be overcome and that the situation could be better. Yet, they remain positive on what is to come.

8.1 Future research

As it has been previously stated, there is not much previous research conducted in this research area, in order to be able to compare the previously mentioned results and to compare the collected data. Thus, the approach is quite novel. For this reason, this last section aims to present several suggestions for future research on this matter. These listed suggestions to take into further research have derived both from the data analysis and from the encountered limitations.

In this study, purposeful sampling techniques have been applied for the data gathering process to ensure reliable data collection. Additionally, the research has applied relevant literature, presented by multiple authors and researchers, to elaborate a holistic conceptual framework in order to give answer to several assumptions, which were presented as research questions. Therefore, the goal was to set this conceptual framework as a starting point and develop new and more specific hypotheses to test.

Hence, which are the suggestions derived from this thesis that should be taken into further research in order to get more accurate data?

The first suggestion to take into account is the fact that the sample must be bigger. In fact, future researches should aim to collect data from different countries independently. That is, analyze a country at a time. Or at least, adapt the employed data collection method to the home language, in order to get enough respondents so that the results could be generalized to whole population.

In fact, addressing each country independently will provide better insights on the differences between northern countries and southern ones. Or between developed countries versus developing ones. As the hypothesis concluded in this research is that theaters from northern European countries are more advanced in digitalization than southern ones. This can also be applied to the theater's size sample. That is, make a deeper research on the differences between theaters of different sizes, instead of generalizing the data to all the sample regardless the size.

One more interesting topic suggestion to take into further research is to make a full and in detail comparison of all the creative industries and their position towards the digitalization of the organization or their use of IT and IS. Or, instead, take one creative industry and theater, and carry out the same research for each, to compare and identify the differences and similarities between them.

Another hypothesis derived from the data analysis is regarding communication. It appears that theater personnel have different opinions when it comes communication quality. Thus, in future researches, a better differentiation of terms should be made; for example, clarify whether the question is regarding social communication or work-related information communication.

Additionally, a term that should be more carefully defined is "digitalization" itself. Future surveys should elaborate more precisely which aspects of digitalization each question is referring to. Or alternatively, the research should address just a specific area of digitalization. For example, in the present research, digitalization term was used, and as some respondents pinpointed, digitalization is a very wide term and any digital solution

could be involved in it. Thus, the scope of the research should be framed in more detail when presented to the sample.

Finally, it is important to remember that the current thesis was focused only on part of the personnel of the theater (e.g. stage managers, technical manager, production director), that is, the personnel who has some degree of authority (i.e. towards higher positions) and who are mainly responsible of the planning process. However, this does not mean that these people are the only ones involved in the planning process. Technicians and actors have been left out of this research, but it would be interesting if future researches could address those people's opinions, in order to have a generalized insight on the whole organization.

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10 APPENDIX 1 – SURVEY QUESTIONNAIRE

*Compulsory

1. **Gender:** *

- ◯ Woman
- ◯ Man
- ◯ Other
- ◯ I would rather not say

2. **Age:** *

- ◯ Under-age
- ◯ Between 18 and 30
- ◯ Between 30 and 50
- ◯ Between 50 and 70
- ◯ Over 70

3. **Country:**

_____

4. **What is your title or position in the organization?** *
You can write your position if the option is not among the answers to choose from.

- ◯ General Manager / General Director
- ◯ Production Director / Manager
- ◯ Technical Director / Manager
- ◯ Stage Director / Manager
- ◯ Actor / Actress
- ◯ Otro: _____

5. **How big is your organization?** *
Based on the average number of people working in the same period of time and counting all the staff (including actors/actresses).

- ◯ Below 10 people
- ◯ Between 10 and 30
- ◯ Between 30 and 50
- ◯ Between 50 and 100
- ◯ More than 100 people

6. **To what extent do you agree or disagree with the following statements?** *

	Totally disagree	Disagree	I don't know	Agree	Totally agree
"I would rate the level of communication within my organization as very good."	◯	◯	◯	◯	◯
"There is good communication among the staff of the same department."	◯	◯	◯	◯	◯
"No information is lost due to lack of communication."	◯	◯	◯	◯	◯
"The staff knows where to find the correct information they need."	◯	◯	◯	◯	◯
"I would be willing to implement a significant change that can generate benefits in the culture of my organization (e.g. in planning processes, communication processes...)."	◯	◯	◯	◯	◯
"I consider that my organization makes an efficient use of the available technological solutions."	◯	◯	◯	◯	◯

7. **In your opinion, how are theatres dealing with digitalization overall?** *

◯ They are very far behind. There are many challenges in theatre when it comes to technology.
◯ They are doing just fine.
◯ They are implementing many state-of-the-art technologies, they are dealing very well.
◯ They are definitely in the forefront of digitalization!
◯ I don't know.

8. **Are you in favor or against digitalization in the work environment?** *

	1	2	3	4	5	
Very in favor	◯	◯	◯	◯	◯	Very against

9. **On average, how much difference is there when comparing technology use in the plays/performances vs technology use in the planning processes?** *

- ◯ Big difference. We use much more technology for the performances on stage than for the planning process.
- ◯ Small difference. We use just a bit more technology for the performances on stage than for the planning process.
- ◯ No difference.
- ◯ Small difference. We use just a bit more technology for the planning process than for the performances on stage.
- ◯ Big difference. We use much more technology for the planning process than for the performances on stage.
- ◯ I don't know.

10. **What kind of software solutions are in use in your organization?** *

Check all the options that are currently in use. You can also write your own answer if it is not among the options to choose from.

- ☐ Human Resources Software
- ☐ Payroll Software
- ☐ Ticketing Software
- ☐ Production planning Software
- ☐ ERP (Enterprise Resource Planning) Software
- ☐ CRM (Customer Relationship Management) Software
- ☐ Otro: _____

11. **What are the main struggles/challenges theatres face when it comes to digitalization?** *

Choose the level of influence that each option has on the digitalization decisions.

	It does not influence	It influences very little	I don't know	It influences to some extent	It has a big influence
Money / Budgeting issues.	◯	◯	◯	◯	◯
The lack of suitable tool(s).	◯	◯	◯	◯	◯
The personnel is not willing to change the old processes it is used to work with.	◯	◯	◯	◯	◯
Lack of time to find suitable tool(s).	◯	◯	◯	◯	◯
The personnel lack technological skills.	◯	◯	◯	◯	◯
Lack of training.	◯	◯	◯	◯	◯
There are no challenges, just lack of interest.	◯	◯	◯	◯	◯
Other reasons.	◯	◯	◯	◯	◯

12. **To what extent do you agree or disagree with the following statements?** *

	Totally desagree	Desagree	I don't know	Agree	Totally agree
"I feel there is a need of digitalization in the production planning process to better manage the information, with the adoption of tools specifically developed for this purpose."	◯	◯	◯	◯	◯
"I think that centralizing the planning process would help to improve efficiency (e.g. by improving communication, decreasing human errors...)."	◯	◯	◯	◯	◯
"I would be willing to learn how to make use of new technologies to better plan the productions and coordinate the staff."	◯	◯	◯	◯	◯

13. **Is there any tool you wish existed to help theatres with their planning processes? (e.g. "I wish there was a tool to help me/us with...")**
This is an open question, you can write or not.

14. **Are there any comments you want to add in relation to this topic? Any opinions that you have not been able to provide in the previous questions?**
This is an open question, you can write or not.

11 APPENDIX 2 – INTERVIEW QUESTIONNAIRE

1. Can you tell me about yourself? E.g. about your background and current role in your workplace.

2. How would you grade the communication level within your organization?
    a. Is there good communication between the personnel?
    b. Information gets shared or lost?
    c. Do people know where to find the right information they need?

3. How are theaters dealing with digitalization overall, in your opinion?
    a. Why theaters are/are not (depends on his/her previous answer) in the forefront of digitalization?

4. Are you in favor or against theater digitalization?
    a. Why (not)?

5. Which benefits do you see theaters currently get from digitalizing their planning process?

6. Do you think that theaters could get more benefit from digitalization?
    a. If so, how?

7. Is digitalization a matter of interest for you?
    a. I.e. Do you often think about the application of new technologies for organizational planning purposes?

8. Do you consider that your organization makes effective use of digital solutions when it comes to planning the productions?
    a. What kinds of digital solutions?
    b. In what ways, can you give some examples?

9. Do you feel the need of digitizing the production planning process, with tools specifically developed for this purpose?

10. Do you think that centralizing the planning process could help improve efficiency?
    a. What could centralization improve in your organization? E.g. communication.

11. In your opinion, what are the main struggles/challenges theaters face when it comes to digitalization?

12. Is there any tool you wish existed to help theaters with their planning processes? (e.g. “I wished there was a tool to help me/us with…”)

13. Is there any comment you would like to add or any matter you would like to discuss that wasn’t addressed in the interview?