

UNIVERSITY OF LJUBLJANA  
SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

**EXPLORING DIGITALIZATION IN DIFFERENT INDUSTRY  
SECTORS: A COMPARATIVE STUDY OF FOUR COMPANIES**

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## **LIST OF ABBREVIATIONS**

AI-Artificial Intelligence

BI-Business Intelligence

CAM-Computer-aided manufacturing

CIM-Computer-integrated manufacturing

CRM-Customer Relationship Management

E-commerce-Electronic Commerce

EDI-Electronic Data Interchange

ERM-Enterprise Risk Management

ERP-Enterprise Resource Planning

FMS-Flexible Manufacturing Systems

FERPA-Family Educational Rights and Privacy Act

GDPR-General Data Protection Regulation

IaaS-Infrastructure as a Service

IAP-Information Access and Protection

IoT-Internet of Things

IT-Information Technology

ITGAP-Information Technology Governance Assessment Process

JIT systems-Just in Time systems

LMS-Learning Management System

ML-Machine Learning

MRP-Material Resource Planning

MRPII-Material Resource Planning (expanded version)

PaaS-Platform as a Service

RIT-Rochester Institute of Technology

ROA-Return on Asset

ROI-Return on Investment

SaaS-Software as a Service

## INTRODUCTION

Digitalization has greatly transformed the way companies produce and provide value to their customers all over the world. Business processes are highly impacted by the incorporation of digital technologies that provide many benefits and advantages for companies. Not only it provides benefits and advantages to companies, but also creates many new opportunities to improve existing business processes and the ways companies operate, cut expenses, and expand their market shares. As we studied the literature on digitalization, we realized it emphasizes technology integration into business processes as one of the core elements of digitalization. What is more, the literature highlights how important digitalization is and will be for the future business world. The aim of this master's thesis is to compare the digital transformation of four companies from four different industry sectors to explore the impact of digitalization on various businesses. Having that in mind, the purpose of this master's thesis is to gain insights into how digitalization impacts various industries and how different companies adapt to its transformation. In addition, it contributes to understanding the drivers and challenges of digitalization in four industries and provides recommendations on how to adapt to the changing digital environment.

Nambisan and Baron (2019), defined digitalization as a way of integrating digital technologies into business processes in order to produce new digital goods and services. Furthermore, Manyika et al. (2016), claim that the only way to stay competitive in today's fast-changing business world is to adapt to digitalization and new technologies that come with it. Not only do they provide the opportunity to stay competitive, but also the chance to improve the company's market position, productivity, and profitability (Kane, Palmer, Phillips, Kiron & Buckley, 2015). On top of that, new technologies can improve the way companies engage with clients and potentially result in the development of new business models (Manyika et al., 2016).

When it comes to industry sectors, every sector has individual features that highly affect the way digitalization is applied and used within the sector. According to Schuh, Anderl, Gausemeier, Ten Hompel & Wahlster (2017), digitalization can generally be used to boost productivity, lower costs or improve supply chain efficiency within every sector. However, some industry sectors have more benefits than just improving productivity and profitability. For example, the healthcare sector utilizes digitalization to enhance patient care, accelerate administrative procedures, and lower medical errors. On the other hand, the retail sector improves inventory control, boosts sales, and improves customer experience by implementing digitalization and new technologies (Manyika et al., 2016). Additionally, an example can be the finance sector where client engagement is improved, operational effectiveness is increased, and risk is reduced by applying digitalization (Liu, Marchewka, Lu & Yu, 2004).

The goals of this Master's Thesis are expected to be the following:



1. Identify digital transformation strategies adopted by each of the four companies
2. Analyze the impact of digitalization on the business processes, operations, and performance of the four companies
3. Identify factors that contribute to companies' success or failure / define key success factor
4. Define the digital culture of each company
5. Risk mitigation
6. Evaluate the success of the digital transformation initiatives of the companies
7. Identify challenges and opportunities that digital technologies present in each industry, and how companies adapt to them
8. Identify the best practices and lessons learned that can be applied to other companies facing similar challenges
9. Analyze how digital transformation has brought business value to each company
10. Compare and contrast the digitalization efforts of the four companies, highlighting similarities and differences

The ultimate goal of the study is to contribute to the existing knowledge of digitalization in different industries and provide useful insights to businesses considering their own digital transformation journeys. As well, by analyzing the experiences and paths of the chosen companies, the study seeks to identify best practices, obstacles, and success factors that can serve as guidelines for future digital transformation efforts in related businesses and industries. Besides, the significance of this study is in identifying challenges and opportunities caused by digitalization in various industry sectors and evaluating the strategies and methods that may be used to help businesses survive and succeed in the digital era. The study's implications are relevant for practitioners trying to enhance their digitalization plans as well as for enterprises, policymakers, and researchers interested in understanding the effects of digitalization on different companies, industries, and the whole business world in general.

Furthermore, the study focuses on answering the following research questions:

1. What digitalization strategies were adopted by companies from different industry sectors?
2. What are the benefits and challenges of four industry sectors that arise from the implementation of digitalization?
3. What are the best ways to use digital technologies in different sectors to achieve success?

This Master's Thesis uses a comparative case study approach to explore how digitalization affects various businesses from different industry sectors. For the purpose of this thesis, four Croatian companies from different sectors are chosen. The needed information is gathered by doing both primary and secondary data analysis. The primary

data is gathered by interviewing employees from each company, while the secondary analysis is done by using the existing data from relevant sources like journals, books, papers, articles, and websites.

## 1 KEY CONCEPTS AND CURRENT TRENDS IN DIGITALIZATION

The term digitalization is commonly used in business and academic literature to describe the process of integrating digital technologies into various aspects of business operations. While the concept of integrating digital technologies into business operations is not new, the term "digitalization" has become more common in recent years (Nambisan & Baron, 2019). The rapid pace of technological change and the increasing availability of digital tools and platforms have led to a renewed focus on digitalization in recent years. While some people may view the term "digitalization" as a buzzword, the concept itself is not new and has significant implications for businesses and society. There are a few concepts one must grasp in order to fully comprehend the process of digitalization. These concepts were studied and thoroughly explained by our red. Prof. dr. Mojca Indihar Štemberger during the course called Information systems management. Each concept held different significance in the process of digitalization and our professor explained them through their own individual presentations.

The first concept would be Industry 4.0, which we could say is an environment and a movement, that in a way not started the digitalization, but enhanced it and made it a necessity. During this fourth industrial revolution, many new *innovations and technological changes*, which are our next concepts, come to light. It is also crucial to realize the difference between the two and adjust further steps taking these concepts into consideration. Some of the most important technological changes and also key features of the Industry 4.0 are *artificial intelligence, machine learning*, and *cloud computing* (Kagermann, Wahlster & Helbig, 2013). All three will be explained in detail. To successfully operate during industry 4.0, a company or an organization needs to have a *digital strategy* implemented. This strategy would serve them as a plan of action. However, not everyone will know how to embrace this new plan of action and that is why we also need to understand the concept of *digital culture*. *Business value creation* is a concept that is set to explain what kind of significance, and its amount, does the information technology have for a company (Daulatkar & Sangle, 2015). Next concept is *IT Governance*, as it is of importance to understand whose responsibility it is to create these policies and processes that ensure efficient use of information technology (De Haes & Van Grembergen, 2004). However, not every business starts or goes through the process of digitalization without struggles and that is why some companies have a *bimodal IT* set in place. To distinguish to which extent a company has been digitalized, we use the term *digital maturity*. Digital maturity will showcase what a company has

already accomplished in terms of digitalization and how it prepares for new digitalization endeavors. As most of these concepts sound very positive and may lead one to believe they are without downfalls, the concept *Privacy and security concerns* will be introduced last.

## **1.1 Industry 4.0**

The term "industry 4.0," also referred to as the "fourth industrial revolution," describes the incorporation of digital technology into the manufacturing process in order to increase productivity, quality, and efficiency. The way people live, and work is changing as a result of this revolution (Ghobakhloo, 2020).

The German government first used the phrase "Industry 4.0" in 2011 to refer to the next stage of industrialization, which would be defined by the usage of cloud computing, cyber-physical systems, and the Internet of Things (IoT) (Kagermann, Wahlster & Helbig, 2013). Since then, organizations looking to use digital technology to enhance their operations have made Industry 4.0 a hot topic of conversation in the manufacturing sector. It is the most recent stage of manufacturing's ongoing growth, which started with the first industrial revolution in the late 18th century and has since progressed through many stages. The steam engine was the defining feature of the first industrial revolution, followed by the use of electricity in industrial processes in the second, industrial automation in the third, and now the fourth (Dalenogare, Benitez, Ayala & Frank, 2018). The fourth industrial revolution can be understood and interpreted as a result of the rising digitization in businesses, claim Dalenogare, Benitez, Ayala & Frank.

The utilization of cyber-physical systems, which refer to the fusion of physical and virtual systems, is one of the fundamental components of Industry 4.0. Since these systems are made to communicate with one another, the manufacturing process may be watched over and managed in real time (Lee, Bagheri & Kao, 2015). For instance, integrated sensors in machinery can provide real-time performance data, enabling producers to spot possible problems before they arise. Additionally, this information can be used to streamline production procedures, increasing effectiveness and decreasing waste (Lee, Bagheri & Kao, 2015). A big step forward in the manufacturing sector's digitization may be seen in the combination of physical and digital systems.

A virtual environment created by a computer simulation of items and actions in the actual world and a network of things and systems that are talking with one another via the internet are the two key components of cyber-physical systems (Oztemel & Gursev, 2020). Cyber-physical systems are growing increasingly significant as the Internet of Things expands because more and more systems are automating and connecting to one another. They do, however, present particular difficulties in terms of dependability and security. One element or component's failure or even a simple compromise might have an impact on the entire system. Due to such a threat, implementation and design of the

cyber-physical system should include a serious and careful consideration of technical and non-technical factors. To best explain both the growing importance and a great responsibility they hold, we can view the case of the autonomous vehicles which are spreading across the United States and are visible on social media platforms. An autonomous vehicle is essentially a self-driving car that has a variety of sensors. These sensors are both visible on the car as they include cameras, radars, and some are not; but they are all made to gather data about the environment (Ghosh, Zaboli, Hong, Kwon, 2023). Data collected is processed by onboard computers, and machine learning algorithms make decisions about how to control the vehicle. Even though to some it may seem as self-driving cars are way in the future, they are already our reality. Failure of one camera may result in a car accident, for example.

Another important aspect of Industry 4.0 is the use of the Internet of Things (IoT), which refers to the network of connected devices and sensors that can communicate with each other. There are various definitions trying to capture the essence of the Internet of Things in one sentence. One of them defines it as things that are connected to the virtual world and are remotely controlled, in addition to acting like an access point to the internet services (Mattern & Floerkemeier, 2010). In a manufacturing context, this could include sensors embedded in machinery, as well as devices worn by workers (e.g., smart glasses). This network of connected devices allows for real-time data collection and analysis, enabling manufacturers to make data-driven decisions (Kamble, Gunasekaran & Gawankar, 2018). The Internet of Things is an example of how digitalization can be used to improve efficiency and productivity in the manufacturing process. Use of the Internet of Things grew in the years, and smartphones have helped this exponential growth. Smartphones, which are part of the Internet of Things, offer to the consumer a lot, ranging from the improved communication in quality and speed, boosting autonomy, facilitating knowledge sharing, etc. (Koohang, Sargent, Nord & Paliszkievicz, 2022). Atzori, Iera & Morabito (2010) defined four broad domains where we can find the Internet of Things: transportation and logistics, healthcare, smart environment, and personal and social domain.

One can assume that a massive increase in the use of the Internet of Things and its devices, brings many challenges. Nord, Koohang & Paliszkievicz (2019) believes privacy, security, and trust are the main problems we are facing. They further indicate how the number of the Internet of Things users can grow only if the privacy and security knowledge are addressed. While IT professionals have the needed knowledge to understand and be aware of the security and privacy issues related to the Internet of Things, end users may not have the same knowledge and awareness to process the level of threat in their devices (Koohang, Sargent, Nord & Paliszkievicz, 2022). The Internet of Things devices are becoming a frequent target for hackers and cyber terrorists around the world (Nord, Koohang & Paliszkievicz, 2019). Moreover, incorporating the Internet of Things and then managing it, also comes with challenges of its own. Integrating new

technologies into and with the pre-existing technologies, managing that complexity, and similar, are to take into consideration when dealing with or introducing the Internet of Things. One must take into account the necessity for standardization and compatibility. Without common standards for data sharing and connectivity among multiple devices, Internet of Things systems might not operate as intended, which would limit their potential benefits (Nord, Koohang & Paliszkievicz, 2019). Each new application of Internet of Things technology comes with a unique set of trade-off criteria, and the network's ability to achieve those requirements may be influenced by the surroundings (Nord, Koohang & Paliszkievicz, 2019). As a result, a key challenge for IoT networks is getting the network to react as needed for each application, which is crucial for the adoption of Internet of Things technology (Nord, Koohang & Paliszkievicz, 2019).

By utilizing the power of digitalization, manufacturers are able to increase efficiency, productivity, and quality through the use of cyber-physical systems, the Internet of Things, and cloud computing. We're likely to see more advancements in digitization in the manufacturing sector as companies continue to adopt Industry 4.0.

The previously mentioned cyber-physical systems and the latest stage of revolution have been affecting the rules of competition in terms of reframed business models due to digitalization; the structure of industry; and customers' demands (Dalenogare, Benitez, Ayala & Frank, 2018). Looking at things from the market's perspective, digitalization, and therefore digital technologies, give companies an opportunity to offer their customers various digital solutions. These digital solutions could be internet-based services which are a part of the product, and so on (Dalenogare, Benitez, Ayala & Frank, 2018).

The importance and impact of Industry 4.0 could be easily noticed by the mere fact that a few countries have started programs to support and increase the development of Industry 4.0 technologies (Dalenogare, Benitez, Ayala & Frank, 2018). Such a program was firstly started in Germany and has further spread to the United States of America, China, France, and Brazil. In Germany it could have been found under the name "High-Tech Strategy 2020", in the United States as "Advanced Manufacturing Partnership", in China as "Made in China 2025", in Brazil as "Towards Industry 4.0". and so on. All in all, despite the fact that the program had different names across countries, the essence was the same-and it was to bring closer the Industry 4.0 concepts and its technologies to their local organizations and firms (Dalenogare, Benitez, Ayala & Frank, 2018).

Furthermore, the world we live in today quite differs from the one that was during the first industrial revolution in terms of the limited natural resources. Before they were available and exploited heavily, but with the ever-growing demand for consumption, they are becoming more and more limited. People are searching for sustainable paths, which of course does not only involve environmentalism, but also economic and social resources. How Industry 4.0 impacts sustainability, and rather, contributes to it, has gained a lot of attention worldwide (Ghobakhloo, 2020). It is noticeable by viewing the

digitalization of the supply chains; pushing the integration across value networks and intercommunication; minimizing inefficiencies, redundancies and non-value-added services and therefore lowering the product/service price, enhancing product's lifetime, increasing profitability, and etc. (Ghobakhloo, 2020). However, the downfalls do exist, and organizations and governments should find ways to either go around them or make up for them.

## **1.2 Artificial intelligence and machine learning**

Two of the most important technical developments of the twenty-first century have been named as artificial intelligence (AI) and machine learning (ML) (Joshi, 2020). Machine learning is a subset of artificial intelligence that uses algorithms to give machines the ability to learn from data without being explicitly programmed. Artificial intelligence is the ability of machines to replicate human intelligence. In numerous industries, artificial intelligence and machine learning have a wide range of applications, and their rising use has fueled the digitalization process (Joshi, 2020).

Initially, the goal was to achieve human-like intelligence in machines for automation by encoding the knowledge of human experts (Dick, 2019). However, current research aims to design machines that perform complex tasks using any means, surpassing human intelligence (Dick, 2019). Thus, meaning that artificial intelligence can now make better decisions, moves, and similar, which bypass human intelligence.

Machine learning, which we have previously defined as a subset of artificial intelligence, is also set as one of the basic principles of artificial intelligence. Machine learning means learning from previous experiences and datasets instead of following instructions (Ahmed, Jeon & Piccialli, 2022). Methods based on machine learning are set to examine the output for each individual pattern that can be recognized and look for reverse-engineering aspects to create an output (Ahmed, Jeon & Piccialli, 2022). In simpler terms, it creates a system of how to make decisions which is based on previous experiences. These methods follow three main categories: reinforcement, unsupervised, and supervised machine learning (Ahmed, Jeon & Piccialli, 2022).

Artificial intelligence and machine learning have found applications in various industries, including healthcare, finance, transportation, and manufacturing. In healthcare, AI and ML assist in diagnosis, drug discovery, and personalized medicine. In finance, they are used for fraud detection, risk management, and investment decision-making (Gartner, 2019). In transportation, AI and ML are applied to route optimization, autonomous vehicles, and predictive maintenance (Joshi, 2019). They assist with supply chain management, quality control, and predictive maintenance in the manufacturing industry (Joshi, 2019).

The progress of digitization has been accelerated by the growing use of artificial intelligence and machine learning. Businesses can now automate operations, get insights

from data, and personalize client experiences thanks to artificial intelligence and machine learning. As a result, efficiency has increased, expenses have decreased, and customer satisfaction has increased.

Marketing is one industry where machine learning and artificial intelligence have made a big difference. Businesses may now examine massive volumes of data to find patterns and trends and tailor their marketing plans and target audiences more effectively because of artificial intelligence and machine learning (Soni et al., 2019). For instance, companies can utilize machine learning and artificial intelligence to study consumer behavior and preferences to develop tailored offers and recommendations. Increased client loyalty and satisfaction can result in more sales in the long run.

Process automation and cost reduction have also been made possible by artificial intelligence and machine learning. Businesses can, for instance, use chatbots to automate customer support, doing away with the need for human agents (Van Pinxteren, Pluymaekers & Lemmink, 2020).

However, the adoption of artificial intelligence and machine learning presents challenges, including ethical implications. Biases and discrimination have been observed in algorithms due to biased training data (Buolamwini & Gebru, 2018), which can perpetuate inequalities and discrimination.

Additionally, the impact of artificial intelligence and machine learning on the workforce is a concern, as certain jobs may become obsolete or require new skills. This raises the need for upskilling or reskilling to remain employable (Autor, 2015). However, these technologies also create new job opportunities in emerging fields such as data analytics, cybersecurity, and artificial intelligence.

### **1.3 Cloud computing**

In contrast to owning and maintaining their own infrastructure, the cloud computing paradigm enables users to access computer resources such as storage and processing power through the Internet (Mell & Grance, 2011). According to Apostu, Puican, Ularu, Suciuc & Todoran (2013), it can be divided into three primary categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).

Because cloud computing helps with digitization initiatives, it has become crucial for modern enterprises. To improve consumer interaction, streamline processes, and spur innovation, businesses must adopt digital technologies into many facets of their daily operations (Legner et al., 2017). By providing the essential infrastructure to support these digital endeavors, cloud computing plays a significant part in this process (Bughin et al., 2017). Additionally, it gives companies the ability to efficiently manage and store massive amounts of data, which is essential for digitalization projects like big data analytics and artificial intelligence (Legner et al., 2017). By providing the necessary

infrastructure, cloud computing also makes it easier to implement future technologies like the Internet of Things (IoT) and blockchain (Wang & Zhang, 2020).

Due to its many advantages, which are essential for successful digitalization, cloud computing is acknowledged as one of the most important digital developments in existence today (Sadeeq et al., 2021). One of the main benefits of cloud computing is scalability. Organizations can swiftly adapt their computing resources to their demands without making substantial capital hardware investments, in contrast to traditional infrastructure (Apostu, Puican, Ularu, Suciuc & Todoran, 2013). This flexibility allows businesses to promptly respond to changing demands and seize new opportunities.

Cost-effectiveness is another advantage of cloud computing (Apostu, Puican, Ularu, Suciuc & Todoran, 2013). Providers typically offer pay-as-you-go pricing models, allowing organizations to pay only for the computing resources they utilize. This eliminates the need for upfront capital investments and enables more accurate forecasting of IT costs (Apostu, Puican, Ularu, Suciuc & Todoran, 2013). Cloud computing also provides greater flexibility compared to traditional IT infrastructure (Kim, 2009). Users can access applications and data from anywhere with an internet connection, using various devices like desktop computers, laptops, tablets, and smartphones. This mobility supports the implementation of remote work policies and facilitates support for mobile employees. Additionally, cloud computing empowers organizations to swiftly respond to market changes and capitalize on emerging opportunities by providing scalable and flexible IT resources (Apostu, Puican, Ularu, Suciuc & Todoran, 2013).

Despite its advantages, cloud computing presents certain challenges and potential disadvantages. Security is a significant concern, as storing and accessing data over the internet requires careful protection against unauthorized access (Yang, Huang, Li, Liu & Hu, 2017). Organizations must ensure that their data is properly secured, and cloud computing providers should have appropriate security measures in place (Hashizume, Rosado, Fernández-Medina & Fernandez, 2013). Vendor lock-in is another challenge, as switching providers can be difficult due to the proprietary nature of cloud computing platforms (Mell & Grance, 2011). This lack of competition can potentially lead to higher costs.

Cloud computing is still a common option for businesses looking to simplify their IT infrastructure and cut expenses, though. It provides the foundation necessary to encourage digitalization, cut costs, and boost flexibility, all of which are crucial for remaining competitive in the market, making it an essential technology for businesses of all sizes. In order to fully capitalize on the anticipated expansion in the cloud computing market, which is anticipated to reach \$832.1 billion globally by 2025 (Research and Markets, 2020), organizations need carefully weigh their alternatives, put in place the necessary security measures, and leverage it.



## **1.4 Innovation and technological changes**

Innovation plays a crucial role in the digitalization of various industries. It involves creating new products, processes, or services that add value to customers and enhance business operations. Digitalization provides companies with access to advanced technologies and data-driven insights, enabling them to innovate and meet customer needs effectively. For instance, companies can utilize artificial intelligence and machine learning to analyze customer data and develop personalized offerings. Additionally, the Internet of Things allows real-time data collection, identifying opportunities for optimization and innovation.

It's important to distinguish between innovation and digital transformation. Every company has an innovation function, irrespective of its digital transformation level. Combining the two concepts can lead to a lack of focus on innovation's distinct metrics and outcomes. While digital transformation can foster innovation and vice versa, they are not synonymous.

Technological advancements like cloud computing, big data analytics, and cybersecurity solutions are key drivers of digitalization. Cloud computing enables efficient data storage and processing without significant infrastructure investment. Big data analytics empowers companies to extract valuable insights from large datasets, informing decisions about customer behavior, market trends, and operational performance. Robust cybersecurity solutions are essential to safeguard against cyber-attacks and data breaches.

The workforce undergoes significant changes due to innovation and technological advancements. As companies adopt new technologies and processes, the required skills of employees evolve. This poses challenges for both workers and employers to adapt to changing labor market demands. Automation is one aspect reshaping the workforce, potentially rendering some jobs obsolete or requiring new skills. Job displacement concerns arise, emphasizing the importance of upskilling and reskilling for employability.

Conversely, technology also creates new job opportunities in emerging fields like data analytics, cybersecurity, and artificial intelligence. These domains demand specialized skills, necessitating investment in training programs. The rise of the gig economy is another workforce transformation driven by technology. Digital platforms connect businesses with freelancers, offering flexible work arrangements. While the gig economy provides flexibility, it raises concerns regarding job security and workers' rights protection.

## **1.5 IT business value**

The amount of significance information technology has for an organization continues to be an interesting research topic (Daulatkar & Sangle, 2015). IT business value is commonly referred to as information systems business value, and its main focus is the

connection between the IT investment and organizational performance (Masli, Richardson, Sanchez & Smith, 2011). The use of IT affects organizational performance at both the intermediate process level and the organization-wide level and includes impacts on both efficiency and competitiveness (Masli, Richardson, Sanchez & Smith, 2011). According to Mukhopadhyay, Kekre & Kalathur (1995), the impressive potential of IT to enhance organizational performance must be balanced against the significant cost of investment, which is a point of ongoing debate. So, even though there is a large potential, the cost of it presents a major concern. The understanding of causality in IT business value has become important for companies to not only justify their investments in IT but also transform their organizations to improve firm performance (Daulatkar & Sangle, 2015). Therefore, the role of main components is introduced. These include alignment with business objectives and the need for dynamic models of IT business value creation, mediating factors, synergy, and IT-enabled transformation (Daulatkar & Sangle, 2015). However, IT business value creation may be possible to measure in intangible terms of benefits, in contrast to the traditional, financial way of measuring performance, ROA, ROI, and so on.

Moreover, Radhakrishnan, Zu & Grover (2008), argue that IT investments do not bring any sustained advantages to organizations, but organizations can leverage those investments by correctly deploying, absorbing, and using IT to make unique, hard-to-replicate, non-substitutable and immobile organizational capabilities. Thus, providing organizations with competitive advantage over its competition (Radhakrishnan, Zu & Grover, 2008).

In an attempt to connect and justify IT spending directly with some output variables (ROA, ROI, etc.) on the firm level, we are possibly ignoring the intermediate processes through which we can feel IT impacts. Radhakrishnan, Zu & Grover (2008) delved into how IT impacts process-level outputs, such as inventory levels, quality, and capacity utilization.

IT has the ability to impact operational processes in three ways: automation, informing, and transforming them to create operational process capabilities. Automation enhances the ability to produce more and better-quality output from inputs. Commonly used automated techniques include robots, computer-aided manufacturing (CAM), computer-integrated manufacturing (CIM), automated JIT systems, and flexible manufacturing systems (FMS) (Radhakrishnan, Zu & Grover, 2008). These techniques result in various benefits, such as enhanced processing capacity, higher labor efficiency, economies of scale, lower production costs, smaller production runs, better product/service quality, and lesser defects, scrap, etc. resulting in decreasing overall operating costs and lowering buffer inventory levels (Radhakrishnan, Zu & Grover, 2008).

With the use of IT, the ability to organize and distribute information through processes like storage, retrieval, and manipulation arises (Radhakrishnan, Zu & Grover, 2008).

Companies often rely on planning systems such as MRP, MRPII, and ERP to help with tasks like material requirement planning, scheduling, quality control reporting, capacity planning, and workload planning. By using these systems, companies have seen benefits such as decreased operational costs and increased operational efficiency (Radhakrishnan, Zu & Grover, 2008).

IT plays a role in improving the sales and marketing process by providing tools for forecasting and managing demand, as well as identifying potential markets (Radhakrishnan, Zu & Grover, 2008). For instance, fashion apparel merchants rely on demand forecasting information systems to predict demand and prevent stockouts, even with the unpredictability of fashion trends and seasonal changes in product assortment (Radhakrishnan, Zu & Grover, 2008). This has resulted in increased sales and higher inventory turnover. Additionally, IT is used to inform the customer relationship process, which helps in maintaining strong customer relationships over time.

Moreover, IT has the power to transform operational processes by altering the way firms interact within their value chains (Radhakrishnan, Zu & Grover, 2008). For example, IT tools such as Electronic Data Interchange (EDI), supply chain management systems, e-procurement systems, and enterprise application systems are used to integrate firms with their suppliers (Radhakrishnan, Zu & Grover, 2008). These systems help strengthen the relationships between firms and their suppliers. By sharing information about production schedules, demand, and forecasting, information asymmetry is reduced, leading to lower operating costs and inventory levels in the supply chain network (Radhakrishnan, Zu & Grover, 2008).

## **1.6 IT governance**

Corporate or enterprise governance is widely recognized as incomplete without IT governance (De Haes & Van Grembergen, 2004). While "corporate governance" refers to the management and direction of businesses, its primary objectives include distinguishing between shareholders, the board of directors, and company management, as well as ownership and control (John & Senbet, 1998). On the other hand, IT governance lacks a single definition and is described differently by various individuals, organizations, and publications.

According to De Haes and Van Grembergen (2004), one definition states that IT governance is the responsibility of the Board of Directors and executive management. It is an integral part of enterprise governance and encompasses the leadership, organizational structures, and processes that ensure the organization's IT aligns with and extends its strategy and objectives. Another definition highlights that IT governance represents the organizational capacity exercised by the Board, executive management, and IT management to control the formulation and implementation of IT strategy, thereby enabling the fusion of business and IT (De Haes & Van Grembergen, 2004).

While these definitions differ in certain aspects, they both emphasize the shared objective of achieving business and IT synergy, which is a primary concern for the board of directors. The term "synergy between business and IT" signifies that an organization's IT utilization should be aligned with its business goals and objectives (De Haes & Van Grembergen, 2004). In simpler terms, IT governance refers to the processes, structures, and policies put in place to ensure the effective and efficient use of information technology (IT) in achieving organizational goals and objectives. Additionally, IT governance plays a critical role in aligning IT investments with the organization's strategies, managing IT risks, and creating value through the proper utilization of IT resources (Weill & Ross, 2004; Masli, Richardson, Sanchez & Smith, 2011).

In today's context, IT has become an integral part of most organizations' operations. However, the increasing complexity and significance of IT present challenges such as managing IT-related risks, ensuring regulatory compliance, and maximizing the value of IT investments. The growing reliance on IT within organizations necessitates effective IT governance. Organizations heavily depend on IT for crucial tasks like managing customer data, financial transactions, and stakeholder communications (Baroudi & Lucas, 1994). Without proper governance, IT-related risks, such as data breaches or system failures, can have severe repercussions, impacting the organization's reputation, financial performance, and overall survival (Van Grembergen, 2014).

Moreover, the complexity of IT systems and infrastructure poses further challenges. Technologies like cloud computing, mobile devices, and the Internet of Things have added layers of complexity that demand effective management (Wang & Zhang, 2020). Implementing robust IT governance helps organizations navigate this complexity by providing clear decision-making processes, resource allocation frameworks, and risk management practices (Van Grembergen, 2014). Additionally, the importance of compliance with regulations and standards related to data protection, cybersecurity, and other IT-related issues necessitates IT governance (Huang et al., 2011).

Successful implementation of IT governance brings various benefits and opportunities, including improved decision-making aligned with business goals and objectives (Weill & Ross, 2004), enhanced security and risk management (Peltier, 2016), increased value of IT investments (Van Grembergen, 2004), improved compliance with regulations and standards (Peltier, 2016), improved communication and collaboration between IT and other business functions (Debreceeny, 2013), and efficient and effective use of IT resources. These benefits contribute to increased competitiveness, improved customer satisfaction, and enhanced financial performance (Sofyani, 2020).

However, implementing effective IT governance poses challenges. The complexity of IT environments makes it difficult to develop and implement suitable governance processes and structures (Joshi, Bollen, Hassink, De Haes & Van Grembergen, 2018). Resistance to change within organizations, along with the lack of awareness and understanding of IT

governance benefits, can hinder successful implementation (Debreceeny, 2013). The absence of clear goals and objectives for IT governance makes it challenging to develop effective processes aligned with organizational needs (IT Governance Institute, 2005). Additionally, resource constraints, including funding, human resources, and time, pose implementation difficulties (Debreceeny, 2013). Inadequate communication and collaboration between IT and other business functions create silos that impede IT governance effectiveness (IT Governance Institute, 2005). Finally, the lack of senior management support hampers the provision of necessary resources, authority, and leadership for successful IT governance implementation (Van Grembergen, De Haes & Guldentops, 2004).

Even though it might be hard to develop successful IT governance, there are some steps that should be considered. One of them is to be aware of how key IT governance decisions are made. According to Weill & Ross (2005), IT governance encompasses five major decision domains:

1. IT principles – consist of high-level choices regarding the business's strategic use of IT; used for clarifying the business role of IT
2. IT architecture – an integrated collection of technical options to direct the organization in addressing business needs; used for defining integration and standardization requirements
3. IT infrastructure – centrally controlled, shared IT services that were often developed before specific usage requirements were clear; used for determining shared and enabling services
4. Business application needs – business requirements for externally or domestically designed IT applications; used for specifying the business need for purchased or developed IT applications
5. IT investment and prioritization – determine how much and where to invest in IT

At the corporate, business unit, or functional level, or some mix of the three, each of these decision-making domains can be managed. Additionally, business units or IT managers may be held accountable by senior management for the resulting results. Therefore, choosing the appropriate decision-makers and assigning responsibility for each decision area is the first stage in building IT governance.

Furthermore, there are six archetypal approaches to IT decision-making (Weill & Ross, 2005):

1. Business monarchy – top managers make all IT-related decisions

2. IT monarchy – decisions are made by a group of IT specialists or a single IT executive
3. Federal system – top managers collaborate with the IT department
4. IT duopoly – a collaboration between IT executives and one other operating unit
5. Feudal system – each business unit making independent decisions
6. Anarchy – isolated individuals or small groups of people make decisions

The first archetype, business monarchy, is the most centralized approach, while the last one, anarchy, is the most decentralized approach to decision-making. However, most companies use a variety of them, employing different approaches for different decisions (Weill & Ross, 2005).

Following the mapping of decision types and decision archetypes, a business must create and put into place a coordinated set of governance procedures that managers will use on a regular basis. As stated by Weill & Ross (2005), there are three types of governance mechanisms:

1. Decision-making structures – ways in which decisions are made and authority is assigned within an organization. These structures can include committees, boards, and other types of formal decision-making bodies.
2. Alignment processes – ways in which IT strategies and initiatives are linked to business goals and objectives. These processes help ensure that IT investments are aligned with the organization's overall strategy.
3. Formal communications – methods used to communicate IT-related information within the organization. This can include formal policies and procedures, as well as informal communication channels such as email and meetings.

Moreover, at a very broad level, companies have two options for how they approach governance: they can accept standards that have been developed and polished through the combined experience of hundreds of organizations and people, or they can approach governance ad hoc and develop their own frameworks (Larsen, Pedersen & Andersen, 2006). Organizations may experience a variety of advantages by adopting a common IT governance structure. Various common IT governance frameworks and assessment techniques have developed over the past 20 years for assessing the effect and performance of IT. 17 tools that are taken into consideration and assessed, according to Larsen, Pedersen & Andersen: ITIL, COBIT, ASL, Six Sigma, CMM/CMMI, IT Service CMM, SAS70, ISO 17799, SOX, SysTrust, PRINCE2, IT Audit, IT Due Diligence, IT Governance Review, IT Governance Assessment, IT Governance Checklist, and IT Governance Assessment Process (ITGAP) Model.

It is safe to say that there is no single best model of IT governance. Different businesses will make an effort to promote different habits given different tactics and organizational structures. But ultimately, measures for business performance, like ROE, ROA, and profit margin, should show that IT governance is effective (Weill & Ross, 2005). According to the research done by Weill & Ross, it is concluded that the most profitable companies tend to be centralized in their approach to IT governance, companies seeking optimal asset utilization attempt to use hybrid approaches to IT governance, and the fastest-growing companies that are focused on innovation and time tend to be decentralized when it comes to IT governance. In other words, there are three performance measures: profit, assets, and growth (Bongiorno, Rizzo & Vaia, 2018).

### **1.7 Bimodal IT**

As is well known, companies in the modern digital era struggle to successfully implement market-driven digital changes and undergo digital transformation. Many businesses must create a new "digital IT" unit or delegate management of IT systems to the business units in order to address these difficulties. These adjustments should make it possible for the company to better understand, be more adaptable, and respond quickly to market possibilities and consumer needs by adjusting both its IT and the services and products it enables (Horlach, Drews & Schirmer, 2016).

When traditional enterprises undergo a digital transformation, two separate speed modes, referred to as "two-speed IT", may result (Horlach, Drews & Schirmer, 2016). In order to respond to rapidly shifting customer needs, a quick customer-facing and business-oriented IT structure is built for carrying out digital innovation. Additionally, businesses utilize the 'classical IT' with the existing IT organization and infrastructure. Due to the fact that it is responsible for maintaining huge core systems that are difficult to replace or modify, this area of the IT organization operates in longer cycles and at a slower pace (Horlach, Drews & Schirmer, 2016). Aside from operating in various speed modes, each part has distinct organizational frameworks and operational procedures. Because of this duopoly of speed, several businesses adopt "bimodal IT" organizations with various governance mechanisms, procedures, and organizational structures (Horlach, Drews & Schirmer, 2016).

The concept of bimodal IT was first introduced by Gartner in 2014, in a report titled "Bimodal IT: How to Be Digitally Agile Without Making a Mess." According to the report, bimodal IT can be defined as a strategy for managing two separate but coherent styles of work where one focused on predictability, and the other on exploration. (Gartner, 2014). Bimodal IT has gained popularity as organizations seek to balance the need for stability and reliability with the need for agility and innovation. Furthermore, this approach is designed to address the growing need for digital transformation and agility within organizations. It is a concept that refers to an organization's ability to operate two separate modes of IT delivery simultaneously. In other words, "bimodal IT" and "two-

speed IT" refer to the coexistence of traditional and digital IT (Horlach, Drews & Schirmer, 2016).

Traditional IT, also known as "core IT", "industrial IT," or Mode 1, is used to ensure that IT operates dependably by providing effective IT services with a high level of operational excellence (Gartner, 2015). This paradigm promotes the industrialization of services (Bils, 2014) while focusing on allowing predictability, scalability, risk aversion, and cost savings (Henthorn-Iwane, 2015). Its operation is based on "systems of records" on the backend, which are designed to offer long-term stability and compliance (Bayley & Shacklady, 2015). On the other hand, Mode 2 is mostly dependent on speed and agility in comparison (Horlach, Drews & Schirmer, 2016). Additionally, it is known as "digital IT" or "agile IT." To follow short-term market trends for which suitable digital services are built in rapid succession, the IT department in this new mode operates like a start-up within the company (Horlach, Drews & Schirmer, 2016).

To have a better understanding of the differences between traditional IT and digital IT, Horlach, Drews, & Schirmer (2016) provided a table with a clear overview of the characteristics of each mode as shown in Table 1.

*Table 1: Traditional vs. Digital IT*

<i>Traditional IT (Mode 1)</i>		<i>Digital IT (Mode 2)</i>
<i>Stability</i>	<i>Goal</i>	<i>Agility and speed</i>
<i>IT-centric</i>	<i>Culture</i>	<i>Business-centric</i>
<i>Remote from customer</i>	<i>Customer proximity</i>	<i>Close to customer</i>
<i>Performance and security improvements</i>	<i>Trigger</i>	<i>Short-term market trends</i>
<i>Performance of services</i>	<i>Value</i>	<i>Business moments, customer branding</i>
<i>Security and reliability</i>	<i>Focus of services</i>	<i>Innovation</i>
<i>Waterfall development</i>	<i>Approach</i>	<i>Iterative, agile development</i>
<i>Systems of records</i>	<i>Applications</i>	<i>Systems of engagement</i>
<i>Slow</i>	<i>Speed of service delivery</i>	<i>Fast</i>

*Source: Horlach, Drew & Schirmer (2016)*



Based on research done by Haffke, Kalgovas & Benlian (2017), generally, as businesses become more aware of the ramifications of digital transformation, they seek more efficient digitization support, which is correlated with the shift to a bimodal IT design. The development of digital business solutions, including ancillary end-user digital services, digital customer communication channels, and the digitization of the company's offerings themselves, is under intense and quickly escalating internal and external pressure. This calls for a level of IT agility and IT exploration that traditional IT governance has not traditionally been designed for (Haffke, Kalgovas & Benlian, 2017). Moreover, they concluded that companies decide on a bimodal IT design because of the need for IT ambidexterity or because of the need for IT agility (Haffke, Kalgovas & Benlian, 2017).

In order to successfully implement bimodal IT, organizations must ensure that they have the right people, processes, and technologies in place. This includes having the right skills and expertise on the IT team, as well as the right tools and technologies to support both modes of IT delivery (Gartner, 2014). Furthermore, bimodal IT involves real implementation actions in the IT organization and IS infrastructure in addition to changing the business-IT alignment on a macro level (Horlach, Drews & Schirmer, 2016). According to Horlach, Drews & Schirmer (2016), bimodal IT is an architectural approach that combines the old reliable, mission-critical backend systems with the newest tools and platforms for agile customer-facing frontend systems. As a result, there is a duopoly of scale-up apps for business-critical functions running on one powerful computer and scale-out applications being dispersed among multiple conventional computers for short-term responses to altered or novel business- or technological-related situations (Pfützner, 2015). According to Greiner (2015), the necessary flexibility is made possible by virtualizing data and resources in a composable modular architecture for traditional IT and digital IT, in part with the help of cloud-based solutions for infrastructure and platform as a service. Moreover, private clouds are frequently used by businesses for traditional IT in order to secure operations and protect against threats (Horlach, Drews & Schirmer, 2016) while also expediting waterfall development (Horlach, Drews & Schirmer, 2016).

Regarding the process level, bimodal IT implies that firms' current operating models and processes are also bimodal. For instance, it is suggested to use "two-speed IT service management" to make it easier to provide value to the client with new business and operating models (Horlach, Drews & Schirmer, 2016). This idea alludes to the innovation and modernization of service delivery, particularly in terms of client communication (Horlach, Drews & Schirmer, 2016). It is necessary to continue with traditional IT service management, particularly in the area of service operations. According to ComputerWeekly (2015) and Horlach, Drews & Schirmer (2016) "two-speed business intelligence (BI)" is a method for providing operations with data and information in a bimodal way. An agile business intelligence model needs to be built while the traditional

BI team in a firm continues to develop BI best practices focused on security and important business goals. To enable self-service reporting, for example, this mode must act in a highly iterative manner and deal with unplanned data discovery (Horlach, Drews & Schirmer, 2016).

The majority of literature on bimodal processes focuses on software development. DevOps is most frequently utilized when building and implementing business-centric services with the aid of traditional IT (Bils, 2014). This approach to software development places a strong emphasis on close coordination between operations, developers, and quality assurance (Meier, 2015). The speed and dependability of service improvement can be increased through quick evaluation and feedback from the company and outside users. According to Horlach, Drews & Schirmer (2016), DevOps is now being used by traditional industries like retail (e.g. Macy's), banking (e.g. Lloyds Banking Group), and utilities (Horlach, Drews & Schirmer, 2016), in addition to digital native businesses like Google, Amazon, and Netflix. In addition, DevOps is frequently combined with agile methods like Scrum (Computerwoche 2014, Horlach, Drews & Schirmer, 2016), or Kanban (Horlach, Drews & Schirmer, 2016).

Furthermore, according to Haffke, Kalgovas & Benlian (2017), there are three archetypes of manifestation of bimodal IT:

1. Bimodal IT on a project-by-project basis (archetype A)
2. IT function structurally subdivided into two modes (archetype B)
3. Bimodal IT in separate organizational divisions (archetype C)

The operationalization of bimodal IT often takes the form of Archetype A, which incorporates a second mode that is used for certain projects. Companies that structurally divide their IT function into two independent sections that operate in accordance with the two modes and so raise their level of bimodality adopt Archetype B. Lastly, Implementing Mode 2 entirely outside of the usual IT role is Archetype C, a less frequent but even more aggressive approach to bimodal IT. In these circumstances, the division running in Mode 2 is typically led by a Chief Digital Officer (CDO) and is frequently referred to as "the digital division" (Haffke, Kalgovas & Benlian, 2017).

Regardless of the approach taken, effective communication and collaboration between the Mode 1 and Mode 2 teams are critical to ensuring that the two modes of IT delivery work together seamlessly (Gartner, 2014). This includes establishing clear lines of communication, shared objectives, and a common understanding of the organization's overall goals and objectives. To support bimodal IT, companies must also have the right tools and technologies in place, such as a flexible IT infrastructure that can support both Mode 1 and Mode 2 IT delivery and tools and platforms that enable agile development and continuous delivery (Haffke, Kalgovas & Benlian, 2017).

When it comes to developing bimodal IT, it is of high importance to mention a number of benefits that come with it, including increased agility and flexibility, faster time to market for new products and services, and improved customer satisfaction. With the right approach and support, bimodal IT can help companies balance the need for stability and innovation and stay ahead of the competition in an increasingly digital world (Valente, Cappelli & Salgado, 2018).

However, there are also some potential drawbacks to consider. One of the key challenges of bimodal IT is ensuring that the two modes of IT delivery work together seamlessly. This requires effective communication and collaboration between the teams responsible for each mode of IT delivery, as well as a shared understanding of the organization's overall goals and objectives (Horlach, Drews & Schirmer, 2016). Although the majority of the publications referenced view the idea of bimodal IT as helpful for tackling the quickly rising digitalization and changing customer and consumer expectations toward digital services, some authors argue that a bimodal IT organization is really fairly detrimental to the firm (Horlach, Drews & Schirmer, 2016). Bimodal IT is mostly attacked in terms of business culture for maintaining "organization silos" and for establishing new silos rather than promoting business transformation that unifies business and IT (Horlach, Drews & Schirmer, 2016). IT teams that operate in these various speed modes may get tense if the IT organization is split into fast and thus "cool" (digital IT) and slow and thus "uncool" (conventional IT) areas (Horlach, Drews & Schirmer, 2016). Competition between the two modes may lead to a lack of cooperation when it comes to implementing innovations created by digital IT in traditional IT (Horlach, Drews & Schirmer, 2016). Bimodal IT does not provide agile governance that links the two modes. The preference is instead for conventional, rigid control structures (Bloomberg, 2014).

In conclusion, bimodal IT is characterized as a stopgap and transitional condition while a whole IT organization is being transformed into a digital business. While addressing the most pressing issues related to digitization, the long-term effects on the backend organization are not addressed (Horlach, Drews & Schirmer, 2016). However, those systems' life cycles are also getting shorter, and traditional IT is seeing a sharp increase in the demand for agility, for instance in software development. In order for businesses to remain competitive, resilience with regard to the agility of the entire IT organization is crucial (Horlach, Drews & Schirmer, 2016). As a result, iteratively reshaping every aspect of IT, from personnel to infrastructure is advised (Horlach, Drews & Schirmer, 2016).

## **1.8 Digital strategy**

Digital strategy is a plan of action that organizations use to leverage technology and digital tools to achieve their business goals (Holotiuk & Beimborn, 2017). Digital strategy defines the ways businesses enhance and transform their business operations, marketing and customer experiences using digital technologies to deliver higher value to their customers and stakeholders (Chaffey & Smith, 2022). Similarly, the Digital Marketing

Institute (2023) states that digital strategy can be defined as a detailed plan outlining how a company or organization will use digital platforms, tools, and channels to accomplish its marketing and business goals (Digital Marketing Institute, 2023). Furthermore, as defined by Lipsmeier, Kühn, Joppen, & Dumitrescu (2020) „digital strategy, which coordinates the digital transformation of a company, must be seen as a central and integrated component of strategic management” (p. 174).

The prevailing perspective of IT strategy for the past three decades has been that a functional-level strategy must be in line with the firm's selected business strategy (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013). Many research studies, including those on business process redesign, intra-firm and inter-firm systems, the business value of IT, and IT outsourcing, among others, have primarily reflected this "alignment" thinking of IT strategy as a functional-level strategy that is aligned but essentially subordinate to business strategy (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013).

Even though the necessity for a digital strategy has been acknowledged by many businesses, structuring such a plan and integrating individual digitization efforts into a strategic idea remain difficult (Schallmo, Williams & Lohse, 2019). The path that companies need to take for their digital strategy, as well as the general guidelines and possibilities to use, are frequently unclear to businesses. It might be argued that the current theories are insufficient, and the literature has not yet presented an integrative method for such a digital strategy (Schallmo, Williams & Lohse, 2019). According to Lipsmeier, Kühn, Joppen, & Dumitrescu (2020), the main challenges when developing a strategy are:

- It is not clear where a digital strategy has to be positioned in the established strategy levels and in particular who is primarily responsible for the digital transformation
- It is not clear whether a digital strategy will be integrated into any existing strategies or whether the digital strategy is treated as a separate document
- It is not clear which strategic elements are necessary for a digital strategy to coordinate the digital transformation of a company
- It is not clear how a development process of a digital strategy has to be designed

Lipsmeier, Kühn, Joppen, & Dumitrescu (2020) proposed an approach for developing a digital strategy that consists of two stages, the definition of a digital strategy and the positioning of a digital strategy, as well as a process for its development. In the first step, defining a digital strategy, we need to understand what the strategy really is and what it represents for the company. According to the authors, “digital strategy describes the overall vision of the company in the context of digitalization, including the strategic measures to achieve it. It defines concrete, short-term, medium- and long-term digitalization goals and initiatives in the context of products, services, and value creation

as well as for the organization and culture of a company” (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020, p. 175). To determine the positioning of a digital strategy, the authors have analyzed different practical examples and research publications (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020). Based on analyzed data, they concluded that there is no agreement on where a digital strategy should fit into the hierarchy of existing strategies. Moreover, they found that there is a disagreement over whether the digital transformation should be managed through an existing strategy, like a corporate or company plan, or through the creation of separate strategy documents (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020). However, considering their analysis and the understanding of Bharadwaj, El Sawy, Pavlou & Venkatraman (2013), they concluded that in the early stages of digital transformation, a digital strategy should be positioned on the business level as a separate document. Furthermore, there will be no distinction between a digital strategy and a business strategy as a result of a company's increasing digital maturity over time. Lastly, the authors argue that digitalization needs to be defined generally as a corporate strategy direction in order for all significant business unit digitalization projects to be in line with one overall and common direction, with exceptions for diversified conglomerate corporations with portfolios that are not worthily coordinated (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020).

Furthermore, when it comes to establishing processes for the development of a digital strategy, the authors did an analysis of established strategy development approaches. These are the top-down approach, the bottom-up approach, and a combination of these two approaches in the form of a down-up approach (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020). Based on the analysis, Lipsmeier, Kühn, Joppen, & Dumitrescu (2020) argue that neither a pure bottom-up nor a pure top-down approach result in an effective digital strategy. In terms of the top-down strategy, full-scale corporate specification or regulation of the digital transformation will not be successful. It is impossible to design the necessary initiatives for a digital transformation in detail at the company level. Moreover, the risks of using a pure top-down approach to design a digital strategy include unrealistic goals, a failure to take into account current structures, procedures, and activities, as well as employee rejection. On the other hand, the bottom-up strategy runs the risk of having a high heterogeneity of solutions, a concentration on gradual improvements, and a low level of exploitation of synergy potentials, but not the dangers indicated above. Thus, they claim that the combination of the two approaches is the best approach to developing a successful digital strategy (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020).

In addition, when it comes to developing a digital strategy, there are some aspects to focus on and to properly define (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020):

- Digital vision – reflects a specific, feasible, and distant (horizon of 5-8 years) vision of the company's future in the context of digitalization

- Digital mission - answers the issue of why the company is undergoing a digital transformation and provides an explanation of the fundamental objective of the digital transformation
- Digital policies - represent a company's core principles in the context of digitalization
- Digital targets – used to create a strategic direction for the digital transformation

Furthermore, Bharadwaj, El Sawy, Pavlou & Venkatraman (2013), have identified the framework for guidance and help in developing a digital strategy. It is made up of four components:

1. The scope of digital strategy – describes the assortment of products and activities, as well as the operations, carried out under the ownership and direct direction of a firm.
2. The scale of digital strategy – is defined by the size and complexity of an organization's digital initiatives and can vary based on factors such as business goals, resources, industry and market factors, and customer needs and preferences.
3. The speed of digital strategy – an important driver of competitive advantage and be divided into four categories: speed of product launches, speed of decision-making, speed of supply chain orchestration, speed of network formation and adaptation
4. The sources of business value creation and capture of digital strategy

In addition, Matt, Hess & Benlian (2015), offer a further structure for a digital strategy that consists of the following four components: financial considerations, technological adoption, organizational changes, and changes in value creation.

Moreover, an important aspect of digital strategy is understanding the target audience (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013). Companies must identify their target audience and develop digital tactics that appeal to them. This includes understanding how their target audience uses digital technology and what channels they use to engage with brands. By understanding their target audience, companies can tailor their digital strategy to their specific needs, which can help them build stronger relationships with customers.

Furthermore, it is crucial that a digital strategy is having a strong online presence (Lipsmeier, Kühn, Joppen, & Dumitrescu, 2020). This includes having a well-designed website that is optimized for search engines and mobile devices, as well as maintaining an active presence on social media platforms. A strong online presence can help companies reach a wider audience and build brand awareness.

Digital strategy should be focused on innovation. Technology is constantly evolving, and companies need to stay up to date with the latest trends and innovations to remain competitive. This includes exploring new digital channels and technologies, such as virtual and augmented reality, artificial intelligence, and machine learning. Finally, digital strategy should be flexible and adaptable. As the digital landscape continues to evolve, companies need to be able to pivot and adjust their strategies accordingly. This includes monitoring industry trends and consumer behavior and making changes to digital tactics as needed.

A digital strategy's key benefits include increased revenue, improved customer engagement, and greater brand awareness. For example, a study by McKinsey & Company found that companies with a strong digital strategy experienced a 5.9% increase in revenue growth compared to companies with a weaker digital strategy (Manyika et al., 2016). Another study by Westerman, Tannou, Bonnet, Ferraris & McAfee (2012), found that companies with a strong digital strategy are more likely to have engaged customers, with 55% of customers reporting a high level of engagement with these companies compared to just 16% for companies with a weak digital strategy (Westerman, Tannou, Bonnet, Ferraris & McAfee, 2012).

We can say that in today's digital age, having a comprehensive digital strategy is essential for organizations of all sizes and industries in order to stay competitive and relevant. By developing a successful digital strategy, companies can improve customer engagement, increase brand awareness, drive growth, and stay ahead of the competition.

## **1.9 Digital culture**

Organizational culture is commonly referred to as the set of shared values, beliefs, norms, and behaviors that characterize an organization. It represents the overall personality and identity of an organization, and it affects how staff members interact with one another and make decisions at work (Judge & Robbins, 2017). When it comes to determining employee attitudes, actions, and performance, organizational culture is extremely important. It defines expectations, sets the tone for the workplace, and directs employee behavior toward accomplishing company objectives (Schein, 2010). A strong and positive organizational culture can foster employee engagement, satisfaction, and commitment, leading to higher productivity and performance (Cameron & Quinn, 2011). According to Schein (2010), organizational culture consists of three levels: artifacts and behaviors that are visible on the surface, espoused values and beliefs that are explicitly stated, and underlying assumptions and values that are deeply ingrained and often unconscious. These levels interact to create a unique culture that distinguishes one organization from another. Organizational culture can be shaped and influenced by various factors, including the organization's history, leadership style, industry norms, and external environment (Judge & Robbins, 2017). It can evolve and change over time through deliberate efforts and interventions by leaders and employees.

A strong organizational culture aligns employee behavior with the organization's mission, vision, and values. It promotes a sense of shared purpose, teamwork, and collaboration among employees (Cameron & Quinn, 2011). It also influences how decisions are made, how conflicts are resolved, and how communication flows within the organization. Organizational culture can, however, have both positive and negative features, which should be noted. A toxic or dysfunctional culture can result in low employee satisfaction, high turnover rates, and hinder organizational effectiveness, while a healthy culture can boost staff morale and organizational performance (Judge & Robbins, 2017).

A part of organizational culture is digital culture. Digital culture can be defined as the ways of life, modes of thought, and artistic and cultural practices that arise with the use of digital technologies (Gere, 2009). This definition highlights the close relationship between technology and culture, as digital technology has become an integral part of everyday life for many individuals. Digital culture has also been shown to influence the way in which organizations approach digital transformation. For example, organizations with a strong digital culture are more likely to be innovative and to embrace digital technology in their operations (Gonçalves, Bergquist, Alänge & Bunk, 2022). In contrast, organizations with a weak digital culture may struggle to adapt to digital transformation, as they may lack the necessary skills and mindset to effectively leverage digital technology.

Digital transformation and its initiatives should not only focus on technology but also on the people and processes. Companies undergoing a digital transformation should guide its people into embracing the digital culture at all levels, meaning at the individual as well as team and organizational level (Hoe, 2019).

Culture comprises a set of values, characteristics, and behaviors that define how things work and get done in a certain organization (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). A good and healthy culture will serve as a code of conduct and as guidelines for employees to act according to; in such a way, they are optimizing the company's goals and strategy (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). Due to the individuality of each organization, there can be no universal digital culture; however, similarities across organizations can be visible as each digital culture should have the five following elements (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018):

1. Digital culture should shed light on external orientation. This means that a digital culture should motivate employees to look outside of the company and engage with its customers and partners. In this way, new solutions and partnerships are created. Additionally, focusing on the customer brings employees closer to the customers' point of view and therefore improves customer experience.



2. Digital culture emphasizes delegation over control, meaning that decision making is rooted into the organization. Employees of such organizations will not receive explicit, step-by-step instructions on how to do a job, but will rather be guided by principles so their final judgment is to be trusted.
3. Digital culture emphasizes boldness over caution, so that employees are encouraged to take the risk, oftentimes fail, learn from the failure, and continue to try.
4. Digital culture encourages action and less planning due to the fast-changing digital world where it is created. Planning and decision-making need to follow the environment and shift from a long-term focus to a short-term one.
5. Digital culture encourages collaboration more than individual effort. Successful digital culture comes as sharing across and within divisions, units and functions is achieved, and when there is collective work. The previously mentioned fast pace of work calls for an increased level of transparency and interaction in contrast to a traditional organization.

These five elements will be different in degree used from organization to organization and in general, from industry to industry. For example, a technology firm will have a different degree of risk-taking in contrast to an industrial goods company (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). Additionally, the degree of risk-taking will differ in a strategy team to that of a finance team, even though they are a part of the same organization.

Furthermore, if an organization wishes to change their current culture with digital culture it should carefully and thoughtfully start the process. Organization's leaders should firstly identify what is their desired digital culture based on the organization's strategy, goals and purpose (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). Characteristics of such culture should also be articulated and communicated. Each characteristic should be tied with and translated into a behavior example, as the employees will look at these behaviors as guidelines (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). In addition, the distinction between current behaviors and those that are targeted should be made, in order to close the gap by incorporating required change. In order for the change to be translated to the employees, an organization must have strong leadership which will lead it (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). This leadership must be the first to use and embrace this new set of behaviors, so that employees can learn by example. Leaders will serve as role models and with new routines being shown to the employees, make them reflect desired behavior (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018). Employee engagement is as important as activating leadership, because there is a focus on employee autonomy with decision making, customer focus, judgement, etc. Leaders should foster this employee engagement with the use of new, nontraditional means, such as gamification (Hemerling, Kilmann, Danoesastro, Stutts & Ahern, 2018).

## 1.10 Digital maturity

We are seeing major changes in current business models as well as the development of new ones, or digital transformation, as a result of the spread of digital technologies like cloud computing, mobile Internet, social media, and big data (Bharadwaj, El Sawy, Pavlou & Venkatraman, 2013). As a result, businesses across all sectors must evaluate their current business models in light of new opportunities and maybe adapt them to the new digital era (Westerman, Bonnet & McAfee, 2014).

According to Lahrmann, Marx, Winter & Wortmann (2011), "maturity" is a condition of being complete, ideal, or prepared and is the end outcome of system development. Organizations and other maturing systems, for instance, develop their capacities over time in order to achieve a desired future state (Teichert, 2019).

Sometimes, without taking into account distinctions, the terms "digital transformation" and "digital maturity" are used interchangeably (von Leipzig et al., 2017), while digital maturity can be thought of more as a methodical approach to an organization's digital transformation (Kane, Palmer, Phillips, Kiron & Buckley, 2017). To successfully distinguish between the two terms, Chantias and Hess (2016), defined digital maturity as "the status of a company's digital transformation" (p. 2). Digital maturity refers to the extent to which an organization has developed its digital capabilities and leveraged them to drive business outcomes. It outlines what a business has already accomplished in terms of transformation efforts and how a business methodically gets ready to adapt to a more digital world in order to remain competitive (Teichert, 2019). Moreover, it involves more than just investing in technology or digitizing processes; it requires a shift in mindset, culture, and ways of working to fully embrace the opportunities that digital transformation offers. Digital maturity outlines what a business has already accomplished in terms of transformation efforts and how a business methodically gets ready to adapt to a more digital world in order to remain competitive (Teichert, 2019). Beyond a purely technical definition that only considers how well a business uses IT to carry out tasks and manage information flows, digital maturity also refers to a managerial definition that describes what a business has already accomplished in terms of carrying out digital transformation efforts, such as changes to its products, services, processes, skills, culture, and abilities regarding the mastery of change processes (Chantias & Hess, 2016).

Although the concept of digital maturity has gained increasing attention in recent years as organizations across all sectors grapple with the challenges of digital disruption, there is no one-size-fits-all approach to digital maturity, as it depends on a range of factors including industry, organizational structure, leadership, and culture. Despite this complexity, there are some common characteristics and best practices that digitally mature organizations tend to share. One of the key drivers of digital maturity is leadership, particularly in terms of creating a clear digital strategy, setting the tone from the top, and fostering a culture of innovation and experimentation. According to a report by Bughin

et al. (2018), the most significant factor influencing the success of digital transformation is strong and visible leadership (Bughin et al., 2018). Another critical factor is talent, including recruiting and retaining employees with the necessary digital skills and mindset, and investing in ongoing learning and development. A study by Deloitte found that "access to the right talent" was one of the top three factors driving digital maturity across industries (Deloitte, 2018). Even though technology also plays a central role, it is not just about investing in the latest tools and platforms. Digitally mature organizations are able to align their technology investments with their strategic objectives and customer needs and have a robust digital infrastructure and data management capabilities (Westerman, Bonnet & McAfee, 2014). Additionally, digital maturity requires a complex set of technologies that are interconnected to produce a seamless experience for customers and employees (Gill & VanBoskirk, 2016). Lastly, digital maturity is closely tied to culture, including a willingness to experiment and take calculated risks, a focus on customer-centricity and continuous improvement, and a shared sense of purpose and values. According to a report by Pederson (2022), all components of digital transformation, including strategy, technology, and talent, are held together by culture.

Since digital maturity is a complex process that requires careful planning and execution, there are several key steps that organizations can take to achieve digital maturity, each of which is supported by a growing body of research. We decided to mention five of them that seem very important and applicable for any company or industry:

1. Define digital strategy – involves creating a clear roadmap for how digital technology will be used to achieve your business objectives (Kane, Palmer, Phillips, Kiron & Buckley, 2015). Capgemini (2018b) recommends developing a digital vision and aligning it with your overall corporate strategy. Deloitte (2018) suggests creating a digital transformation office to oversee the process.
2. Develop digital leadership – involves identifying leaders who are capable of driving digital transformation and empowering them to take action (Westerman, Bonnet & McAfee, 2014). Bresciani, Ferraris, Romano & Santoro (2021), recommends investing in digital leadership training programs, while McKinsey (2018) suggests creating a digital center of excellence.
3. Build digital capabilities – involves investing in the technology, people, and processes needed to execute your digital strategy. Deloitte (2018) recommends developing a digital talent strategy, while Kane, Palmer, Phillips, Kiron & Buckley (2017) suggests building agile cross-functional teams.
4. Foster a digital culture – involves creating an environment in which employees are empowered to experiment, take risks, and learn from failure (Westerman, Bonnet & McAfee, 2014). McKinsey (2018) recommends creating a culture of continuous

learning, while Kane, Palmer, Phillips, Kiron & Buckley (2017) suggests building a culture of collaboration and innovation.

5. Measure digital maturity – involves developing metrics and benchmarks to assess your organization's progress (KPMG, 2019). Capgemini (2018a) recommends using a digital maturity model to assess your organization's strengths and weaknesses. Deloitte (2018) suggests conducting regular digital readiness assessments.

In addition, more research supports these steps. For example, Kljajić & Pucihar (2021), found that building digital capabilities was a critical factor in achieving digital maturity while Berman and Kim (2019) identified the importance of digital leadership in driving successful digital transformation. By following these steps and leveraging the insights from research, organizations can achieve digital maturity and position themselves for success in a rapidly evolving digital landscape.

The last step, measuring digital maturity, is a complex and multifaceted process, as it involves assessing an organization's capabilities across a range of dimensions including strategy, culture, talent, technology, and customer experience. There are a variety of frameworks and models that can be used to assess digital maturity, such as the Digital Maturity Model by Capgemini (Capgemini, 2018a). This type of model typically involves assessing an organization's maturity level across a range of categories, such as leadership and strategy, customer experience, operations, and technology. They often use a scoring system to benchmark an organization's maturity level against industry standards or best practices and provide recommendations for areas of improvement.

Other than knowing why digital maturity is important, and what are some of the major steps to achieve it, it is of high importance to mention what digital maturity brings us. Digital maturity offers numerous benefits to organizations that have successfully completed their digital transformation journey. These benefits span a wide range of areas, from improving customer experiences to increasing operational efficiency and reducing costs. Here are some of the key benefits of digital maturity that are supported by a growing body of research:

- Improved customer experiences – digitally mature organizations are better equipped to meet the changing needs and preferences of their customers (Capgemini, 2018b). By leveraging digital technologies such as artificial intelligence and data analytics, these organizations can personalize their interactions with customers and provide them with a seamless omnichannel experience (Capgemini, 2018b).
- Achieving operational excellence – by streamlining processes, automating tasks, and using data analytics to optimize performance, digitally mature organizations can improve their efficiency and reduce costs. They can also improve their agility and responsiveness to changes in the market (Westerman, Bonnet & McAfee, 2014).

- Increased innovation – digitally mature organizations are more likely to experiment with new technologies and business models, leading to the development of new products and services (Bughin et al., 2018). They are also better able to identify and act on emerging trends and opportunities (Bughin et al., 2018).
- Benefits in terms of talent management – digitally mature organizations are able to attract and retain top digital talent by offering a dynamic and innovative work environment (Deloitte, 2018). They can also develop their existing workforce by providing them with digital skills training and upskilling opportunities (Kane, Palmer, Phillips, Kiron & Buckley, 2017).
- Enhancing an organization's reputation and brand image – by being seen as a leader in digital transformation, an organization can improve its credibility with customers, partners, and investors (Westerman, Bonnet & McAfee, 2014).

Overall, digitally mature organizations enjoy a range of benefits. There are more benefits that arise as a result of digital maturity including increased agility and speed to market, improved customer experience and satisfaction, greater operational efficiency, and enhanced innovation and collaboration (Rader, 2019). Thus, digitally mature organizations are also better positioned to respond to disruption and competition, and to capitalize on new opportunities in emerging technologies such as artificial intelligence, blockchain, and the Internet of Things (Rader, 2019).

Additionally, in a survey of over 1,000 global executives, Westerman, Tannou, Bonnet, Ferraris & McAfee (2012) found that digitally mature organizations are 26% more profitable than their peers. This highlights the tangible business value that can be achieved through digital maturity. Furthermore, a study by Kane, Palmer, Phillips, Kiron & Buckley (2017) found that companies with a strong digital culture were more likely to achieve digital transformation success, with 71% of digitally mature organizations reporting success compared to just 21% of less digitally mature organizations.

However, achieving digital maturity comes with its challenges. One of the biggest obstacles is resistance to change, particularly among employees who may feel threatened by the shift towards digital technologies and ways of working (Deloitte, 2018). This requires a concerted effort to communicate the benefits of digital transformation and to involve employees in the process (Capgemini, 2018b). Another challenge is the pace of technological change, which can make it difficult for organizations to keep up and to stay abreast of emerging trends and opportunities (Westerman, Bonnet & McAfee, 2014). This requires a willingness to experiment and take calculated risks, as well as the ability to pivot quickly when necessary (Kane, Palmer, Phillips, Kiron & Buckley, 2017). Lastly, there is the issue of data security and privacy, particularly in light of increasing concerns around data breaches and cyber-attacks (Westerman, Tannou, Bonnet, Ferraris & McAfee, 2012; Deloitte, 2018). Digitally mature organizations need to have robust data

management and security protocols in place to protect sensitive information and to ensure compliance with regulations such as GDPR and CCPA.

Digital maturity is a critical factor in today's business landscape, as organizations seek to harness the opportunities offered by digital transformation. While the path toward digital maturity is complex and multifaceted, there are some common drivers and best practices that can help organizations achieve success. By focusing on leadership, talent, technology, and culture, and by measuring and benchmarking digital maturity using established frameworks and models, organizations can enjoy a range of benefits and stay ahead of the competition.

### **1.11 Privacy and security concerns**

The digital era has brought about significant technological advancements and transformed our way of interacting with the world. However, along with these advancements come new challenges, particularly in the areas of privacy and security. The increasing collection and storage of personal information in digital form have raised concerns regarding how this information is being used and protected (Udo, 2001).

Privacy and security concerns in online information technology (IT) are often rooted in the overall information society rather than just the security of values. Users' apprehension about privacy and security is a major deterrent to online shopping (Udo, 2001). While privacy and security concerns are often considered as a single construct in privacy literature (Liu, Marchewka, Lu & Yu, 2004; Xu, Teo, Tan & Agarwal, 2012), there is a need to understand them as separate issues (Belanger, Hiller & Smith, 2002; Vijayasarathy, 2004). Privacy refers to individuals' control over their personal information, while security pertains to measures taken to protect that information from unauthorized access or misuse (Belanger, Hiller & Smith, 2002; Hoffman, Novak & Peralta, 1999).

Privacy concerns have a significant impact on the digital economy, as individuals hesitate to disclose personal information due to privacy concerns or a lack of trust (Culnan, 2000; Malhotra, Kim & Agarwal, 2004). The perceived control over personal information plays a crucial role in shaping privacy concerns (Xu, Teo, Tan & Agarwal, 2012). Users may worry about how their personal information is handled and shared on websites (Hong & Thong, 2013). Privacy concerns can also be influenced by customer attributes such as gender, age, and education (Riquelme & Roman, 2014). Awareness of information gathering and use after the initial transaction can further influence consumers' level of privacy concern (Sheehan & Hoy, 2000).

One approach that has gained traction is privacy by design, which involves integrating privacy considerations into the design of products and services (Lopez, Rios, Bao & Wang, 2017). By incorporating privacy from the beginning, rather than as an afterthought, privacy by design ensures that privacy and security are fundamental aspects. A contextual

approach to privacy, considering social, cultural, and legal contexts of data collection and use, is suggested to achieve privacy by design (Nissenbaum, 2011).

Technological advancements have also raised privacy and security concerns. For instance, the use of digital assistants poses risks as they process sensitive user information, raising concerns about interception or misuse (Kröger, Gellrich, Pape, Brause & Ullrich, 2022). Similarly, the utilization of big data and data analytics raises privacy concerns due to the creation of detailed profiles and potential misuse (Lopez, Rios, Bao & Wang, 2017). The growing prevalence of the Internet of Things (IoT) also contributes to privacy and security risks, as IoT devices collect and transmit personal data that can be intercepted or hacked (Ziegeldorf, Morchon & Wehrle, 2014).

Privacy and security issues encompass various aspects, including consumer privacy, maintaining online privacy and anonymity, payment fraud, identity theft, stalking, computer hacking, email concerns, and child protection on the Internet (Udo, 2001). These concerns stem from worries about the use of personal data by the government and corporations, uncertainty about how personal data is used, challenges in maintaining privacy and anonymity online, risks of payment fraud, unsolicited emails (spam), and the safety of children (Udo, 2001).

In the realm of e-commerce, privacy concerns act as barriers to consumer engagement in transactions involving personal information (Gurung & Raja, 2016). Protecting consumer privacy is crucial for the success of e-commerce, as collecting information on consumers is essential for understanding their preferences (Gurung & Raja, 2016). Managers in e-commerce face the challenge of balancing data collection for increased sales and profitability while protecting customer privacy (Gurung & Raja, 2016).

Efforts to protect privacy online have been outlined by the Electronic Frontier Foundation (EFF) and include steps such as avoiding inadvertent disclosure of personal information, enabling cookie notices, maintaining a separate email address, being cautious about revealing personal details to strangers, being mindful of potential monitoring at work, not replying to spammers, and being aware of web and home computer security (EFF, 1999).

Blockchain technology has been proposed as a potential solution to privacy and security concerns due to its decentralized and tamper-resistant nature (Kshetri, 2018). Its transparency enables individuals to track data access and usage, while transparency in data collection and use can be facilitated through technologies like blockchain (Solove, 2011; Haber & Stornetta, 1991).

Addressing privacy and security concerns in the digital era requires a comprehensive approach involving individuals, companies, and governments. Governments and companies should implement robust data protection laws, conduct security audits, and invest in cybersecurity measures (European Union Agency for Cybersecurity, 2020; Goralski, 2019). Individuals should have control over their personal data, including the

ability to delete it or opt out of data collection and processing (Ziegeldorf, Morchon & Wehrle, 2014). By adopting a proactive stance toward privacy and security, the advantages of the digital era can be realized while minimizing risks (European Union Agency for Cybersecurity, 2020; Goralski, 2019; Ziegeldorf, Morchon & Wehrle, 2014).

Although the mentioned recommendations were proposed years ago, they still hold relevance in today's technologically advanced world, emphasizing the importance of user privacy and security.

## **2 METHODOLOGY**

### **2.1 Industry sectors explained**

An industry is a group of successful companies or establishments that develop or offer goods, services, or sources of money (Encyclopaedia Britannica, 2022). These companies engage in the same economic activity and frequently face off against one another. The industry can be characterized as the collection of all businesses that produce comparable goods or offer comparable services. Despite their disparate geographic locations, these businesses have a lot in common and compete in the same markets.

Depending on the type of economic activity, industry can be split into many sectors. fundamental, secondary, tertiary, and quaternary are the four fundamental divisions of industry sectors (Encyclopaedia Britannica, 2022). We will go into more detail on these elements later in the text, but each sector has its own distinct features that are influenced by things like resource availability, technology, and market demand. Furthermore, in order to make decisions on resource allocation, investment, and strategic planning, it is crucial for policymakers, investors, and enterprises to have a thorough grasp of these industries.

For better acknowledgment, the difference between industry and sectors lies in their scope. Industry refers to a group of businesses that produce similar goods or services, while sectors refer to the different types of economic activities. Industry can be used to describe businesses at a very granular level, such as the automobile industry or the software industry. Sectors, on the other hand, are broader categories that encompass multiple industries.

Businesses engaged in the extraction and harvesting of natural resources, such as those in agriculture, forestry, fishing, mining, quarrying, and the exploitation of minerals, are considered to be part of the primary sector (Encyclopaedia Britannica, 2022). The dependence on natural resources is frequently used to describe this industry. Furthermore, because it supplies the basic resources needed by other sectors, it is frequently seen as the economy's foundational sector. The primary sector can be divided into two categories:



the genetic industry, which produces raw materials that can be increased by human involvement in the manufacturing process, and the extractive industry, which produces raw materials that are exhaustible and cannot be raised through cultivation (Encyclopaedia Britannica, 2022). The development of research and technology in relation to renewable resources has an impact on all genetic industries, including agriculture, forestry, animal management, and fisheries. Extractive industries include the mining of mineral ores, quarrying of stone, and the extraction of mineral fuels (Encyclopaedia Britannica, 2022). Additionally, these companies frequently operate in isolated locations and directly affect the environment. They struggle with issues including resource scarcity, climate change, and regulatory limitations.

The manufacturing sector, often known as the secondary sector, either builds capital equipment to make both consumer and non-consumer items, refines commodities that secondary industries have previously made, or uses raw materials from primary industries to produce consumer goods (Encyclopaedia Britannica, 2022). Secondary industries also include those that generate energy (such those in the hydropower sector), in addition to the building sector. Additionally, secondary sector companies are distinguished by the way they use machinery and technology to turn raw materials into completed goods. Large capital investments are needed for these firms, which frequently operate in urban locations (Encyclopaedia Britannica, 2022). They must contend with issues including technological disruption, low-cost producers' competition, and shifting consumer preferences. Additionally, the secondary sector is often seen as a key driver of economic growth, as it creates jobs and adds value to raw materials. There are two sorts of secondary industry that can be distinguished: heavy, or large-scale, and light, or small-scale (Encyclopaedia Britannica, 2022). Large-scale industries frequently have a complicated industrial structure, employ a skilled, specialized labor force frequently, supply a wide range of markets, including those for other manufacturing industries, require significant capital expenditures for buildings and equipment, and produce a lot of goods. Examples include the processing of petroleum, making steel and iron, building heavy equipment and automobiles, making cement, processing nonferrous metals, packing meat, and developing hydroelectric power (Encyclopaedia Britannica, 2022). The nondurability of produced goods, the lesser capital investment in plants and equipment, and the potential for nonstandard items like customized or handcrafted goods are further ways that the light industry, often referred to as a small-scale industry, can be separated from the heavy industry. The labor force can be highly skilled in the production of electronics and computer hardware, precision instruments, gemstone cutting, and artisan work, or low skilled in the production of textiles and apparel, food, and plastics (Encyclopaedia Britannica, 2022).

Businesses that generate revenue by offering services or immaterial benefits rather than tangible goods are included in the tertiary sector, also referred to as the service industry (Encyclopaedia Britannica, 2022). Usually, both public and private firms make up this

sector. Services for health, social welfare, administration, police, security, and defense are also included in this sector's industries, in addition to banking, finance, insurance, investment, and real estate services, wholesale, retail, and resale trade, transportation, professional, consulting, legal, and personal services, tourism, hotels, restaurants, and entertainment. Additionally, organizations in the tertiary sector are distinguished by their emphasis on offering services to both individuals and other companies. These companies frequently operate in cities and have substantial human resource needs. They deal with difficulties like shifting consumer preferences, escalating competition, and regulatory constraints. Because it is impacted by variables including income levels, population expansion, and technological innovation, the tertiary sector is sometimes considered as a mirror of the economy's overall health. The industry is also characterized by labor-intensive tasks that demand a lot of customer service and human connection (Kenessey, 1987). The industry relies heavily on knowledge and calls for specific knowledge and abilities. Although it is dependent on the output of the primary and secondary sectors to provide goods and services, the tertiary sector is relatively stable and less affected by fluctuations in demand and external factors compared to the primary and secondary sectors (Kenessey, 1987).

Focused on information-based or knowledge-oriented goods and services is quaternary industry, a division of tertiary industry that is commonly recognized as a separate sector (Encyclopaedia Britannica, 2022). It includes both corporate and state activities, just like the tertiary sector. The industries and activities in this sector include media and communications technologies and services, consulting, information systems and information technology (IT), research and development, including technological and scientific development, financial and strategic analysis, and education, including instruction and educational technologies and services (Encyclopaedia Britannica, 2022). In addition, the quaternary sector is concerned with research, development, and innovation. It is highly knowledge-intensive and requires specialized knowledge and expertise (Kenessey, 1987). The sector is characterized by constant innovation and research, and it is relatively small compared to the other sectors. The quaternary sector operates on a global scale and often involves collaboration across countries and regions (Kenessey, 1987).

## **2.2 Common challenges and opportunities of digitalization**

Digitalization and the widespread use of digital technologies have brought a wide range of opportunities and challenges for businesses all around the world (Parviainen, Tihinen, Kääriäinen & Teppola, 2017).

Improved operational efficiency and productivity are one of the biggest opportunities provided by digitalization. Digitalization offers the automation of business operations, which allows employees to focus on more creative tasks that require critical thinking, which cannot be highly influenced by digital technologies, and in that way, businesses

increase their efficiency and productivity. As stated in the research by the McKinsey Global Institute, digitalization can boost productivity by up to 15%, which is a lot (Koeleman, Ribeirinho, Rockhill, Sjördin & Strube, 2019). Besides automating repetitive jobs, digitalization can speed up workflows and lower the time and expenses related to creating goods and services, which are other ways contributing to increased efficiency and productivity (Parviainen, Tihinen, Kääriäinen & Teppola, 2017).

The opportunity to reach a larger audience is also created by digitalization. New technologies offer new ways of communication and connection, so companies can find potential and new clients through social media or search engines. These types of platforms make connections more approachable since over 4.2 billion people are using social media platforms actively (Hootsuite, 2022). Besides, social media allows businesses to connect with clients from all over the world because they possess bare limitations, especially when it comes to communication. Additionally, collaboration is facilitated as well. People from all over the world can collaborate effectively using tools like video calls, direct messaging, remote meetings, and file exchange. Furthermore, these types of digital technologies create the opportunity to enhance customer engagement and experience and ensure customer loyalty (Parviainen, Tihinen, Kääriäinen & Teppola, 2017).

Another opportunity that can result from digitalization is the ability to accelerate the speed of innovation (Agostini, Galati & Gastaldi, 2020). According to Agostini, Galati & Gastaldi (2020), companies that use digital tools and technologies can make rapid experimentation and iteration, quick and efficient testing, and improvement of ideas. Moreover, in that way, companies can easily launch new goods and services, and have a better shift to consumer demands and market situations (Agostini, Galati & Gastaldi, 2020). This should be considered a very valuable type of opportunity in today's world because it is hard to keep up with new trends, technologies, and changes in the market. Also, changes and demands are shifting more and faster than ever, so to be able to speed up the time to adapt to those changes is priceless for businesses.

Last, but not least, as stated by Parviainen, Tihinen, Kääriäinen & Teppola (2017), there is an opportunity for businesses to create new business models and revenue streams due to the possibility to sell insights or develop new goods and services based on customer data.

However, it might be hard for businesses to realize some or all of these opportunities. Parviainen, Tihinen, Kääriäinen & Teppola (2017), provided four recommendations for companies that want to benefit from using digitalization, and those are:

1. Take a customer-centric approach to digitalization and focus on delivering value to customers instead of implementing technology for its own sake
2. Create a clear digital strategy that is in accordance with the company's goals and identify potential advantages and disadvantages

3. Develop a culture of innovation and experimentation which encourages taking risks and trying new things
4. Spend money on the infrastructure needed to support new technologies

On the other hand, there are potential obstacles and challenges that come with implementing digitalization. Many challenges are related to the privacy and security of data. One of them is cybersecurity. Cyber-attacks are increasing from day to day due to the enormous amount of sensitive data that is stored. So, although data protection is the ultimate goal of every company, it is also the biggest challenge, especially taking into account that the average cost of a cyber-attack is \$13 million (Accenture, 2019). Furthermore, managing that amount of data can be mind-boggling, considering that every piece of information needs to be properly stored, processed, and analyzed to provide valuable and reliable insights, or otherwise, it cannot be used for any purpose. Here come the challenges related to data quality and reliability since businesses have to develop secure, ethical, and responsible strategies to handle the data (Almeida, Santos & Monteiro, 2020). Besides, there is a risk of data being misused, so businesses need to have a strong focus on the ways data is used.

As processes and jobs become more and more automated, job displacement results as a challenge. Workers are losing their jobs because either they do not have qualified knowledge and skills and are unable to adapt to new technologies or are not needed anymore because they are replaced by new technologies. Both ways present a significant challenge for individuals and governments all around the world, especially having in mind that by 2030 around 375 million workers, which is around 14% of the global workforce, might need to change jobs due to automation (Manyika et al., 2017).

Since digitalization has the potential to change the way businesses operate, there are additional changes that should come with it, such as significant shifts in mindset, organizational structure, and company culture. Digitalization and new technologies emphasize cooperation between organizational departments, transparency of information, sharing information among employees, agility, etc. which create remarkable changes within the company and require commitment and willingness of employees to embrace new ways of working. However, some people find it hard and challenging to accept changes and new things, so might refuse to be a part of it, which makes the digital transformation process more complicated.

### **2.3 Background and rationale for the study**

The transformation of practically every element of our daily life by digital technologies during the past ten years has been astounding. Big data, artificial intelligence, the Internet of Things, smart factories, and other digital technologies have all altered how we interact, access information, acquire knowledge, work, shop, and more. All of these advances and changes were brought about by the digitalization process, which significantly changed

how many individuals went about their daily lives (Vartolomei & Avasilcai, 2019). The term "digital transformation" has several different definitions. One of the most generally used definitions of digital transformation comes from Vial (2019), who described it as "a process wherein organizations respond to changes taking place in their environment by using digital technologies to alter their value creation processes" (p.119).

Many businesses have digitalized their business operations to increase efficiency, productivity, and innovation as a result of the growing importance and pervasiveness of digital technologies (Creutzig et al., 2022). Although there are no one size fits all approach to digitalization, different industry sectors confront different opportunities and obstacles when integrating digital technology (Aksin-Sivrikaya, S., & Bhattacharya, 2017). For businesses to make wise decisions and successfully integrate digital technology, they must have a thorough understanding of the digitalization process occurring across diverse industry sectors. In order to understand the opportunities and problems given by digital technology across these industries, this study intends to investigate the digitalization process in four organizations operating in various industry sectors.

#### **2.4 Definition of a research problem and objectives**

For businesses to stay competitive in the market, digital technology adoption and deployment have become essential. However, the digitalization process is intricate and poses particular difficulties in several business sectors. Previous studies on digitalization have largely concentrated on one particular industry or technology, which has led to a limited knowledge of the digitalization process across many industry sectors (Creutzig et al., 2022). As a result, there is a void in the literature describing the process of digitization in many industry sectors.

By performing a comparative examination of four organizations that operate in various industry sectors, the suggested study seeks to close this gap. This study will discover industry-specific obstacles and opportunities as well as common challenges and opportunities of digitalization across several industry sectors by investigating the process of digitalization in these businesses. This study seeks to give a thorough overview of the digitalization process in many industry sectors and useful insights for businesses to use when choosing which digital technologies to employ.

When adopting and using digital technologies to enhance their business processes, organizations operating in various industry sectors will be able to make educated decisions thanks to the practical insights provided by this research.

#### **2.5 Case study selection criteria and justification**

To investigate the impact of digitalization on different industry sectors, we designed a comparative study of four companies in our home country, Croatia.

Before attending University of Ljubljana, we were bachelor students at RIT Croatia. This college is a part of the Rochester Institute of Technology, a private research university with a campus based in Rochester, NY. RIT Croatia, which fosters digital culture and overall innovation, was due to these reasons quickly to shift to the digital world when the Coronavirus started. Digital culture is strongly embedded into the employees, as no change or resistance was felt for the students during the shift. This was one of the main reasons why we have asked RIT Croatia for an interview where we can get a few more facts and details known, in addition to those already made known during our four years of studying.

For the tertiary industry, we have chosen the area of hospitality, Hilton Garden Inn Zagreb. Lucija is a part of the Hilton Honours Community, which is a loyalty programme, and therefore was already familiar with this type of digitalization. To further that knowledge, and shed light on their changes and operations, they have, as well, accepted the invitation to sit down for an interview.

To study the secondary industry sector, we selected Hrvatska Industrija Šećera, one of the largest and most successful manufacturing companies in Croatia. Our aim was to understand their digitalization efforts, including their motivations, challenges, and outcomes. Although two other companies declined our invitation to participate, Hrvatska Industrija Šećera was enthusiastic about collaborating and sharing their knowledge. This allowed us to gain valuable insights into the impact of digitalization on the manufacturing sector and identify key factors that influence the success of digital transformation efforts in this industry.

The primary industry sector presented a unique challenge as few Croatian companies in this sector have undergone digital transformation. However, we were able to gather relevant data on Vici Ventus, a company operating in quarrying industry. This enabled us to explore the potential impact of digitalization in the primary sector and identify areas for future research.

## **2.6 Data collection methods and data analysis techniques**

Data collection methods are crucial in any research project. The accuracy and reliability of the data collected directly affect the quality of the results and conclusions are drawn. There are two main types of data collection methods: primary and secondary.

Primary data are gathered using methods that are most appropriate for the current study challenge (Hox & Boeijs, 2005). Every time primary data is gathered, new information is contributed to the repository of social knowledge that already exists. There are many ways to collect primary data like experiments, surveys, interviews, observation, focus groups, etc. Furthermore, the most significant benefit of gathering one's own data is the ability to tailor the research design, data collection strategy, and operationalization of theoretical constructs to the research question (Hox & Boeijs, 2005). This ensures that

the study is coherent and that the data collected actually contributes to the problem's solution. The fact that it is expensive and time-consuming to collect one's own data is the biggest drawback (Hox & Boeije, 2005).

On the other hand, study items with qualities that have been coded in variables with a variety of potential values make up secondary data (Hox & Boeije, 2005). This particular form of data can be found in a variety of journals, online pages, research reports, books, magazines, documents, etc. because it was gathered by a person other than the main user. Furthermore, secondary data has the drawback that it might not be the best solution for the research issue at hand because it was originally gathered for a different purpose, or, in the case of qualitative data, it might be challenging to interpret without explicit knowledge of the informants and the context. The benefit of employing secondary data is significantly lower costs and quicker access to pertinent data (Hox & Boeije, 2005).

Both primary and secondary data, as well as primary and secondary data gathering methods, were employed for the goals of this master's thesis. Using secondary data included a detailed analysis of the current literature, papers, research, journals, websites, and other pertinent information sources. These resources served as the study's information base and gave us, the researchers, insight into the implementation of digitalization as a whole. On the other hand, we gathered primary data by conducting four interviews.

In addition to interviews, other primary data collection methods that could have been used include surveys and observations. We could have included more people in the study by using surveys, and we could have learned more about the implementation of digitalization firsthand by conducting observations. However, due to time and resource limitations, it was decided that interviews were the best way to gather primary data for this particular study.

## **2.7 Interviews**

For this Master thesis, we have undergone a data collection journey that involved conducting four interviews for four companies. These interviews served as a crucial source of primary data and were done in order to learn the first-hand details about how each company is using digitalization.

We have employed a mixed-method approach by conducting two video conferencing calls and the remaining two interviews in person. To structure these interviews, we adopted a semi-structured approach, which provided a balance between flexibility and guidance. Semi-structured interviews allowed us to use open-ended questions that would collect rich and detailed responses while also providing a loose framework to ensure the conversation remained focused on the research objectives. Moreover, this type of approach allowed participants to elaborate on their experiences and opinions on the implementation of digitalization within their companies. This approach ensured that we

covered key topics while also allowing participants the freedom to express themselves in their own words.

We have recorded two of the interviews that were done through video conferencing. To record them, we used audio recording devices to ensure accuracy and completeness. This method allowed us to capture every word of the conversation, preventing the loss of valuable data. Additionally, it relieved us of the need to take extensive notes during the interviews, enabling us to focus on active listening and probing when necessary. On the other hand, we have manually written the information we got during the two interviews that were done in person.

To streamline the analysis process, we developed a coding scheme that encompassed key themes and concepts relevant to our research objectives. After collecting the information from interviews, we used a coding scheme to analyze the qualitative data and identify patterns and themes across the different companies. The coding scheme included codes for different topics, such as implementation challenges, benefits of digitalization, and organizational readiness for digitalization. During the coding process, each segment of data was read and assigned one or more relevant codes. For example, if the participant mentioned challenges faced during the implementation of digitalization, the segment of data was coded with the “Implementation challenges” code. Furthermore, the data segment was coded with the “Benefits of digitalization” code if a participant talked about the advantages of digitalization. This systematic approach to coding facilitated the organization of a large volume of qualitative data, ultimately leading to the emergence of meaningful findings and conclusions.

The next stage was to conduct an analysis to look for trends and themes after all the data had been coded. To find patterns and topics among the four organizations under investigation, the coded data was then put into groups based on commonalities. This allowed for a more thorough and nuanced understanding of the implementation of digitalization in the companies and helped inform the conclusions drawn from the research.

To successfully perform interviews and collect informative data, we had to focus on forming compatible and relevant questions. For that purpose, we have used presentations from two of our courses that are the closest to our Master’s Thesis when it comes to the topics and concepts. After seeing which concepts and topics are the most relevant when it comes to digitalization, and what we were supposed to focus on while learning for our exams, we have written them down and started forming questions related to them. For example, we realized that the presentations emphasized the importance of IT governance within the company, so we formulated questions like “Who makes decisions regarding IT within your organization, and who makes the decisions about IT investments?” or “Would you say that IT governance enables business/IT alignment? If yes, in what way?” This type of open questions would provide us with more than just a single answer because



other than answering our questions, participants would provide a description of their IT governance and things related to it, which would allow us to gain more data than we hoped for. Furthermore, we tried to focus on the concepts that we mentioned at the beginning of our thesis, which we also retrieved from the courses' presentations. In that way, we were able to form a connection between the theoretical and practical parts of the thesis.

Before conducting interviews, we focused on searching for the appropriate companies for our research. This was the biggest challenge when it came to primary data collection because many companies refused to participate with an explanation that they were not able to provide the answers to the questions we had.

After finding companies that were willing to participate, conducting interviews was quite easy compared to the process of finding companies. We have not faced any challenges when it comes to interviews, other than finding a time when both us and each interviewee were free to do it.

*Table 2: Interviews conducted*

<b>Company name:</b>	Interviewee:	Duration:	Mode:
<b><i>RIT Croatia</i></b>	<i>Director of Strategic Development ITS and Facilities</i>	<i>60 minutes</i>	<i>Video conferencing</i>
<b><i>Hilton Garden Inn</i></b>	<i>Chief Digital Officer</i>	<i>68 minutes</i>	<i>In person</i>
<b><i>Hrvatska Industrija Šećera (HIŠ)</i></b>	<i>Head of IT</i>	<i>110 minutes</i>	<i>Video conferencing</i>
<b><i>Vici Ventus</i></b>	<i>One of the three owners</i>	<i>40 minutes</i>	<i>In person</i>

*Source: Own work.*

As we can see in the Table 2, the first interview we did was with RIT Croatia because they seemed to be the easiest ones to get in touch with since we were bachelor's students there. What is more, they did not hesitate to do the interview and immediately decided to help us. The interview was done with the Director of Strategic Development ITS and Facilities through video conferencing and it lasted for an hour. The second interview was done with Chief Digital Officer from Hilton Garden Inn. This interview was done in person and lasted a little bit longer than an hour. The company immediately decided to participate and help us with the research. Then we did an interview with Hrvatska Industrija Šećera whose interviewee is the Head of IT. This interview was done through video conferencing because their location is in a different city than ours. What is more, this one was the longest interview we had among all companies. This is due to the fact

that we have little knowledge about manufacturing sugar and software that could be used in this type of business, so we took more time to gain a better understanding of the processes and technologies used within the company. Lastly, we conducted an interview with the owner of Vici Ventus in person. Due to the fact that the primary sector is not very developed when it comes to digitalization, this interview lasted only for 40 minutes because there was not much information that could be provided from the company's side.

### **3 DIGITAL TRANSFORMATION IN VICI VENTUS**

Vici Ventus d.o.o., is a Croatian company specializing in the extraction of ornamental stone and stone for construction, including limestone, gypsum, chalk, and slate. In other words, it is a limited liability company for the construction and exploitation of mineral resources.

#### **3.1 Industry-specific challenges and opportunities of digitalization**

The rise of digital technology has had a profound impact on various sectors, including the primary sector. This digitalization wave has brought forth numerous opportunities for the primary sector, such as improved production processes and enhanced data management (Ślusarczyk, Tvaronavičienė, Haque & Oláh, 2020).

Some of these include the use of automation and operational hardware, such as robots and 3D printing solutions, to automate and optimize any wasteful, laborious, and risky operational operations and procedures (Pomfret, 2023). Furthermore, using linked mobility, virtual and augmented reality, and remote and centralized workers to perform better and more efficiently are all possible opportunities in this area. Furthermore, integration of IT and operational IT, cybersecurity, task outsourcing, and data interchange are just a few of the many opportunities that could result from digitalization implementation (Pomfret, 2023).

However, alongside these opportunities, digitalization in the primary sector also poses several challenges. One of the major hurdles is the limited availability of digital infrastructure and technology access, particularly in developing countries, which may hinder full adoption and utilization of digitalization by farmers (Aiyetan & Das, 2021). Additionally, challenges include the necessity for education and training to equip farmers with the necessary skills to effectively use digital tools, concerns regarding cybersecurity, high investments costs, and potential social implications on rural communities. Despite these obstacles, the benefits of digitalization in the primary sector are vast.

For instance, the use of digital technologies, like precision farming and drones, can offer significant potential in reducing the environmental impact of farming practices through efficient resource management, such as water and fertilizers (Hassan-Vasques, Maroto-Molina & Guerrero-Ginel, 2022). Moreover, digital technologies play an important role in improving food security by increasing yields and minimizing waste. Additionally, the

utilization of digital technology in agriculture allows data-driven decision-making, empowers farmers to make informed choices regarding crop management and respond to market trends.

In summary, digitalization brings forth both opportunities and challenges for the primary sector. Hence, it is important to address these challenges while fully leveraging the potential opportunities. This can be achieved through investments in digital infrastructure, education and training programs, and collaborative efforts between the public and private sectors, ensuring that small-scale farmers are not left behind in the digital era. By collectively overcoming the challenges of digitalization, the primary sector can enhance its efficiency, sustainability, and productivity while contributing to food security and economic development. Furthermore, it is crucial to recognize that digitalization supports diversification within the primary sector by creating new market prospects and facilitating access to global supply chains. Therefore, policymakers and stakeholders at all levels should prioritize investments in digitalization within the primary sector (Ślusarczyk, Tvaronavičienė, Haque & Oláh, 2020).

### **3.2 Core business processes and business performance**

Vici Ventus, being a relatively small and fairly new company in the quarrying world, finds itself at the initial stages of its operational journey. Presently, the company's primary focus is centered around the acquisition of essential equipment, a pivotal step that paves the way for future quarrying activities. It's worth noting that these investments come at a substantial cost and necessitate extensive deliberation and justification among stakeholders.

The current core business activities of Vici Ventus revolve around the comprehensive examination of soil properties, market dynamics, and the meticulous selection of the most suitable equipment for future quarrying endeavors. These foundational processes constitute the bedrock upon which the company's future operations will be built.

Soil testing plays a vital role in ensuring that the soil meets the necessary criteria for Vici Ventus' operations. It involves a comprehensive analysis of the soil's quality, composition, and inherent characteristics, determining whether the soil contains the desired rock and if it's conducive for extraction. This analysis guides the company in formulating the right approach for the extraction process.

Following this, Vici Ventus shifts its focus to understanding the dynamics of the market. The company delves into how the rocks or other minerals it extracts resonate with its customers. This entails examining customers' perceptions of these resources, how they assign value to them, and whether they have specific preferences or readily available substitutes. Vici Ventus also keeps a close eye on competitors, studying their pricing strategies and competitive advantages. This thorough market examination equips the company with the insights needed to position itself effectively.

Finding the most suitable equipment is another pivotal aspect of Vici Ventus' operations. The company aims to strike a delicate balance between cost and quality, ensuring that the equipment it invests in is not only cost-effective but also highly efficient and fit for the purpose. This careful selection process guarantees that Vici Ventus optimizes its operations, delivering the best outcomes while managing costs effectively.

### **3.3 Digital culture**

The digital culture within this company can be described as relatively underdeveloped. The organization is structured around three primary stakeholders, often referred to as investors or owners, who have established a management board member to oversee day-to-day operational activities. The key decision-making authority rests with these owners, known as "Članovi društva" in Croatia, who are responsible for major strategic choices.

In assessing the company's digital culture, it becomes apparent that its digital capabilities are closely tied to the individual digital competencies of the owners and the designated member of the management board. Essentially, the extent of the company's digital knowledge and proficiency is commensurate with the collective digital expertise of these key figures. The organization's digital landscape is shaped by their combined understanding and capabilities in the digital domain.

### **3.4 Digital transformation strategy**

The primary sector in Croatia has remained notably underdeveloped in terms of digitalization, and this context sheds light on the company's cautious approach to embracing digital technologies. Our interviewee, while not having precise insights into the specific factors behind this digital lag, expresses openness to integrating digital tools into their business operations. However, they emphasize that the current stage of their company's development has not necessitated extensive digitalization efforts.

The interviewee recognizes the significant advantages offered by digitalization, including process automation and enhanced operational efficiency. They harbor a strong desire to steer their company toward this direction in their future endeavors. While the company may have been slow to embark on its digitalization journey, the interviewee acknowledges the compelling benefits that digital technologies can bring, indicating a willingness to explore these opportunities as the company evolves. Furthermore, he highlights the importance of digitalization through the desire of staying competitive, and not being left behind on the market.

### **3.5 Creation of business value**

In this particular scenario, the precise manner in which IT generates business value remains uncertain, mainly because the company has not made any significant IT investments that could directly or indirectly facilitate this process. To gain deeper

insights, a comprehensive analysis will be necessary, but this can only be undertaken once the company acquires the requisite technological equipment and has had the opportunity to incorporate it into their operations over a considerable period. This period of practical utilization will serve as a critical phase for evaluating the tangible impacts of IT on the overall business value.

### **3.6 IT governance**

As mentioned earlier, the company isn't directly engaged in the digitalization process and doesn't maintain an internal IT department. However, when it comes to matters pertaining to IT governance, the key aspect revolves around determining responsibility for significant IT investment decisions. Given that IT investments typically involve substantial expenditures, it's essential for the three company owners to reach a consensus on the rationale behind acquiring such assets. The financing aspect of acquiring new equipment also warrants comprehensive deliberation. Each owner retains the prerogative to put forth their respective proposals and substantiate their viewpoints and choices. Moreover, if a member of the management board identifies an investment opportunity, they can present it to the owners. Subsequently, the owners will collectively assess the proposal, and if it aligns with sound reasoning, engage in discussions and ultimately vote on the proposed investment. This collaborative decision-making process ensures that investments are made judiciously and in the best interests of the company.

### **3.7 Risk mitigation**

Vici Ventus does not have any risk mitigation policies. Notably, Vici Ventus does not maintain an online presence; it lacks even a basic website. Moreover, the company does not rely on automated digital business processes that could be susceptible to disruption or cyber threats.

In spite of this minimal digital footprint, they do, however, have some financial records, market information, information of geotechnical testing, etc. It is worth emphasizing that each owner within the company takes on the responsibility of safeguarding this data individually. This decentralized approach to data protection minimizes the exposure to digital risks associated with centralized systems.

### **3.8 Key success factors**

In this context, identifying the key success factors of digitalization proves to be a challenging task simply because there hasn't been an initiation of any digitalization process to date. The absence of such a process means that we currently lack the essential elements or benchmarks that would typically be examined to determine the factors conducive to a successful digital transformation. Therefore, the primary focus at this stage is on preparing the groundwork for the commencement of digitalization rather than evaluating its potential success factors.

## 4 DIGITAL TRANSFORMATION IN HRVATSKA INDUSTRIJA ŠEĆERA

Hrvatska Industrija Šećera (HIŠ) was formed in 2019 through the merger of Virovitica Sugar Factory, Županja Sugar Factory, and Osijek Sugar Factory.

### 4.1 Industry-specific challenges and opportunities of digitalization

Digitalization in the secondary sector, which encompasses industries involved in manufacturing and processing raw materials, presents its own set of challenges. These challenges stem from the unique characteristics and requirements of the sector. Here are some industry-specific challenges of digitalization in the secondary sector (Personal communication, Interviewee, April 2023):

1. **Legacy Systems and Infrastructure:** Many companies in the secondary sector have long-standing legacy systems and outdated infrastructure that were not designed to accommodate modern digital technologies. Upgrading or integrating new digital solutions can be complex and costly, requiring significant investments in hardware, software, and training.
2. **Interoperability and Standardization:** The secondary sector often involves multiple stakeholders, including suppliers, manufacturers, distributors, and customers. Achieving seamless interoperability and standardization across different systems, equipment, and processes can be challenging. Ensuring compatibility and smooth data exchange between various entities is crucial for optimizing efficiency and productivity.
3. **Industrial Internet of Things (IIoT) Integration:** Digitalization in the secondary sector involves leveraging the potential of the Industrial Internet of Things (IIoT) to connect and monitor physical assets and equipment. However, integrating IIoT devices, sensors, and networks into existing infrastructure can be complex, particularly in environments with harsh conditions or specialized machinery. Ensuring secure and reliable connectivity and data exchange is a significant challenge.
4. **Data Security and Privacy:** The secondary sector deals with sensitive information, such as proprietary manufacturing processes, intellectual property, and supply chain data. Ensuring data security and protecting intellectual property from cyber threats and unauthorized access becomes crucial during the digitalization process. Robust cybersecurity measures, data encryption, and access controls are essential to safeguard valuable information.

5. **Workforce Transformation and Skills Gap:** Digitalization requires a skilled workforce capable of operating, maintaining, and troubleshooting advanced digital technologies. However, the secondary sector often faces a skills gap, as workers may not possess the necessary digital literacy or expertise to leverage and adapt to new technologies. Reskilling and upskilling programs become crucial to bridge this gap and enable a smooth transition to digitalized operations.
6. **Connectivity and Reliability:** Reliable and high-speed connectivity is vital for real-time data transmission, remote monitoring, and control of equipment. However, the secondary sector often operates in remote or geographically dispersed locations where internet connectivity may be limited or unreliable. Establishing robust and stable connectivity infrastructure becomes a challenge that needs to be addressed to fully exploit the benefits of digitalization.

On the other hand, when it comes to opportunities in the secondary sector, some that are worth mentioning are improved operations, increased efficiency and productivity, reduced costs, outsourcing, improved quality control, enhanced customer experience, enabling data-driven decisions, optimization of processes, etc. (Gülen, 2023).

#### **4.2 Core business processes and business performance**

Hrvatska Industrija Šećera d.d. is a company operating in the sugar industry, specializing in the production and distribution of sugar products. In our interview with one of the company's employees, we learned about the key processes that form the core of HIŠ's operations. These processes include sugar beet cultivation and procurement, sugar processing and refining, packaging and distribution, and quality control.

Sugar beet cultivation and procurement are essential for HIŠ's operations. The company collaborates closely with contracted farmers to ensure the cultivation of high-quality and sustainable sugar beets. HIŠ provides farmers with agricultural expertise, seed varieties, and guidance to optimize yields. Continuous communication and collaboration with farmers allow the company to monitor crop health, address challenges, and secure a reliable supply of raw materials for sugar production.

After the sugar beets are harvested, HIŠ engages in the processing and refining of sugar. The company operates modern sugar mills equipped with advanced machinery. The process involves cleaning, slicing, and extracting sugar juice from the beets. The juice undergoes purification and crystallization steps to obtain refined sugar.

Furthermore, packaging and distribution are integral parts of HIŠ's operations. The company utilizes efficient packaging lines and facilities to package its sugar products. Various packaging options are offered to cater to diverse customer needs, while sustainable packaging materials are prioritized. Strict quality checks are implemented to ensure the integrity and safety of the products. With a well-established logistics network,

HIŠ efficiently distributes its sugar products to domestic and international wholesalers, retailers, and food manufacturers.

Moreover, quality control is paramount for HIŠ. The company has a dedicated department equipped with advanced laboratory facilities and qualified experts. Stringent quality assessments are conducted at various stages, from raw materials to finished products, to ensure compliance with national and international standards. Comprehensive tests are performed to measure parameters such as sugar content, moisture levels, color, and purity. By adhering to strict quality control protocols, HIŠ guarantees consistent, safe, and high-quality sugar products.

Additionally, to the mentioned core processes, HIŠ places emphasis on research and development activities to drive innovation and enhance its product offerings. Investments are made in R&D initiatives to explore new sugar products, improve production processes, and develop sustainable practices. Through these efforts, the company aims to meet changing customer demands, adapt to market trends, and ensure long-term growth and competitiveness in the sugar industry.

Over the years, HIŠ has achieved consistent revenue growth, attributed to its strong market position and effective sales strategies. The company offers a diverse product portfolio, including granulated sugar, powdered sugar, and specialty sugars, catering to various customer segments and market demands. This adaptability to consumer preferences has contributed to revenue growth.

In terms of profitability, HIŠ has maintained healthy margins, indicating efficient cost management and pricing strategies. Operational excellence and continuous process improvements have allowed the company to optimize production costs and enhance profitability. Cost-saving measures, such as energy-efficient production processes and streamlined supply chain management, have also been implemented to reduce overhead expenses. Lastly, HIŠ has established a strong market presence in the sugar industry, both domestically and internationally. The company holds a significant market share in Croatia, serving as a leading sugar producer and supplier in the country. Thus, the company has successfully expanded its presence in international markets, exporting its sugar products to numerous countries.

### **4.3 Digital culture**

The digital culture fostered within Hrvatska Industrija Šećera emphasizes transparency, collaboration, and effective communication. The company values the involvement of all management levels, from senior executives to middle managers and supervisors, ensuring clear lines of communication with workers responsible for executing the company's mission.



Integral to this digital culture is the focus on feedback and continuous improvement. Hrvatska Industrija Šećera encourages employees, especially those at the operational level, to provide timely feedback on their experiences, identifying both successful practices and areas that need attention. This feedback enables the company to swiftly address challenges, make necessary improvements, and adapt to evolving market demands.

Collaboration plays a vital role in Hrvatska Industrija Šećera's digital culture. Despite distinct departments with decision-making authority, the company fosters a collaborative environment where departments work harmoniously on a daily basis. Decisions regarding technology investments, for instance, involve close collaboration between the IT and production departments, as they are primary users of new technological advancements. However, final decisions rest with management, who evaluate factors such as financial viability, potential efficiency gains, and strategic alignment.

Managerial support and enthusiasm are key components of Hrvatska Industrija Šećera's digital transformation. Top management actively champions the adoption of new technologies and conveys a long-term vision for these advancements. By demonstrating commitment to digital transformation, management inspires employees at all levels to embrace change confidently. This shared sense of purpose fosters a positive and forward-thinking atmosphere, empowering employees to explore and integrate new technologies into their work processes.

The digital culture within Hrvatska Industrija Šećera extends beyond technology, emphasizing open and honest communication. Employees are well-informed about the implications of digital transformation and the evolving nature of their roles. This transparent approach builds trust and reassures the workforce as they witness top management's commitment to leveraging digital solutions as long-term strategic assets.

In summary, Hrvatska Industrija Šećera's digital culture prioritizes transparency, collaboration, effective communication, and strong managerial support. By embracing these principles, the company cultivates an environment where innovation thrives, employees are engaged, and digital transformation becomes a shared journey toward sustained success in an ever-changing business landscape.

#### **4.4 Digital transformation strategy**

To have a successful digital transformation, an organization must have a clearly defined mission and vision statement. In the case of Hrvatska Industrija Šećera, the mission and vision statement are communicated on their website as well: "Our mission is to generate profit, meet the needs of our customers with sugar production and distribution that satisfies them in terms of quality and price, ensure the well-being of our employees, and increase the capital of our owners" (Hrvatska Industrija Šećera, n.d.). On the other hand, the company's vision is: "to actively participate in the growth and development of the

region and the Croatian economy by providing a solid foundation for the future" (Hrvatska Industrija Šećera, n.d.).

One step toward achieving the digital transformation of the company was the merger of Virovitica Sugar Factory, Županja Sugar Factory (Sladorana d.d.), and Osijek Sugar Factory to form Hrvatska Industrija Šećera in 2019. The decision to merge was driven by several strategic reasons and objectives. Firstly, the companies wanted to improve their efficiency and save costs by combining their resources and streamlining their processes. By working together, they aimed to eliminate redundancies and achieve better overall operational performance. Secondly, the merger was intended to strengthen its position in the market and enhance its competitiveness. By joining forces, the companies increased their market share and gained more bargaining power with suppliers and customers. As a result, this collaboration aimed to establish HIŠ as a leading player in the sugar industry in Croatia.

Furthermore, the merger was a response to the changing dynamics of the sugar industry. With changes in production quotas, market conditions, and regulations, the companies believed that coming together would allow them to adapt more effectively and improve their resilience in the face of these challenges. Moreover, the companies also recognized the opportunity to learn from each other and implement best practices in areas such as production processes, quality control, and sustainability initiatives. By sharing their knowledge and expertise, they aimed to drive operational improvements and foster innovation within the new entity.

The merger was a strategic move to achieve several important outcomes such as increased production capacity, cost savings through synergies, expanded market presence, and enhanced expertise through knowledge exchange. Additionally, they aimed to create a stronger, more efficient, and competitive entity in the Croatian sugar industry. Also, the merger provided opportunities for growth, adaptation to industry changes, and the optimization of resources, all with the ultimate goal of sustainable success in the market.

When it comes to the advantages of digitalization, the merger allowed the company to bring together the IT systems and resources of the three individual factories. This type of consolidation helped streamline operations, improved data management and enhanced the overall efficiency of the company's digital infrastructure. Furthermore, it provided an opportunity to develop a unified digital strategy for the newly formed company. It involved aligning the digital goals, objectives, and initiatives of individual factories into a cohesive plan which served as a roadmap for the company's digital transformation and guided the implementation of new technologies and digital solutions. Additionally, they brought together the knowledge, skills, and resources of the three factories which allowed employees with different backgrounds and expertise to share their knowledge and best practices to foster innovation and drive the adoption of new technologies. Last but not least, consolidating data from the three factories enables HIŠ to leverage the power of

data analytics because the company could use advanced analytics tools to analyze production data, market trends, and customer behavior. All these insights helped drive strategic decision-making, identify areas of improvement, support the company's growth and profitability, and collectively contributed to the company's successful digital transformation in the modern business landscape.

Today, HIŠ's digital transformation strategy is focused on technology adoption, data-driven insights, streamlined operations, customer-centricity, innovation, collaboration, and continuous improvement. The company implements automation systems, digital platforms, and data analytics tools to optimize processes, improve decision-making and enhance productivity. Furthermore, the company aims to streamline its operations through digitalization and process optimization which results in smoother workflows and improved overall productivity. Moreover, they are constantly investing in customer relationship management (CRM) and digital platforms to better understand customer needs, personalize offerings, and provide seamless interactions which build strong relationships and drive customer loyalty. By embracing digital technologies and practices, HIŠ aimed to stay competitive, enhance its market position, and deliver value to its stakeholders. However, the company is aware that digital transformation is an ongoing process, so they emphasize continuous improvement by regularly assessing the effectiveness of digital initiatives, monitoring key performance indicators, and making necessary adjustments.

#### **4.5 Creation of business value**

According to our interviewee, one of the main sources of business value for HIŠ is its operational and production capabilities. The company has invested in modern and efficient manufacturing technologies, allowing it to benefit from economies of scale and optimize production processes. This efficiency enables HIŠ to produce sugar products at competitive costs, ensuring profitability and value creation. Additionally, strategically locating production facilities near sugar beet fields provides logistical advantages and reduces transportation costs, further adding to its business value.

Market presence is another crucial factor in HIŠ's creation of business value. The company has established a strong market position as a leading sugar producer and supplier, both domestically and internationally. This market presence allows HIŠ to leverage its brand recognition, distribution network, and customer relationships to generate revenue and capture market share. By maintaining a significant presence in the sugar industry, the company enhances its business value and sustains its competitive advantage.

Furthermore, HIŠ's diverse product portfolio contributes to its creation of business value. Granulated sugar, powdered sugar, and specialized sugars are just a few of the many sugar products that the business offers. This product diversification enables HIŠ to cater to

different customer segments and meet various market demands. By providing a comprehensive portfolio, the company enhances its revenue streams and expands its customer base, thereby creating additional business value.

Sustainability efforts are also important in creating business value. HIŠ is committed to environmental responsibility and sustainable practices throughout its operations. To reduce its environmental impact, the corporation makes investments in waste management systems, energy-efficient technologies, and renewable energy sources. These sustainability strategies not only help to preserve natural resources but also improve the brand value and reputation of the business. Increasingly, customers and stakeholders value companies that prioritize sustainability, making it a key driver of business value for HIŠ.

Lastly, the company's commitment to quality plays a significant role in creating business value. HIŠ adheres to rigorous quality control processes and certifications to ensure the highest standards of sugar production. Customers' trust and loyalty are gained by the company by constantly providing high-quality sugar products, which improves its brand's reputation and value proposition. Customer decision-making is heavily influenced by quality, so HI's commitment to providing top-notch goods enhances its commercial value.

#### **4.6 IT governance**

Hrvatska Industrija Šećera d.d. recognizes the importance of effective management and oversight of its information technology to drive digital transformation and maximize the use of IT resources. The company has implemented strong practices to govern its IT operations, align IT investments with business goals, enhance IT security and risk management, and improve overall IT performance.

Our interviewee said that a key element of HIŠ's IT governance is the establishment of clear IT policies and guidelines. The company has developed a comprehensive set of policies that outline rules, procedures, and standards for the use of IT resources and systems. These policies cover areas such as data privacy and protection, IT security, acceptable use of technology, and compliance with regulatory requirements. By providing clear guidelines to employees, HIŠ ensures responsible and best practice use of IT resources.

To oversee IT governance, HIŠ has formed an IT governance committee consisting of senior executives and IT professionals. This committee is responsible for defining the IT strategy, reviewing IT investments, and monitoring the performance of IT initiatives. Regular meetings are held to assess the alignment of IT projects with business objectives, review IT budgets, and make strategic decisions regarding IT investments. This governance structure ensures collaborative and well-informed decision-making, taking into account both business needs and IT capabilities.

## 4.7 Risk mitigation

The company has implemented strong risk management practices to identify, evaluate, and address potential risks across different aspects of its business.

One of the key areas of risk management for HIŠ is supply chain risk. As a sugar producer, the company relies on a complex supply chain that involves sourcing raw materials, production processes, and distribution channels. HIŠ has implemented measures to mitigate supply chain risks, which includes building strong relationships with reliable suppliers and implementing quality control procedures. Working closely with suppliers and ensuring the quality of raw materials, helps the company minimize the risk of disruptions in its supply chain and maintain consistent production capabilities.

Market risk management is another area of focus for risk mitigation at HIŠ. The company operates in a dynamic market influenced by factors such as sugar price fluctuations, changing demand, and regulatory changes. To mitigate these market risks, the company must closely monitor market trends, conduct different market research, and diversify its customer base. By staying informed about market dynamics and having a diverse customer portfolio, the company reduces its exposure to market volatility and increases its ability to navigate changing market conditions.

Financial risk management is also important for HIŠ to maintain financial stability and liquidity. The company employs strategies such as hedging against currency exchange rates and interest rate fluctuations. These risk management measures help mitigate the impact of financial market changes and ensure a stable financial position. Additionally, the company maintains prudent financial policies, regularly monitors its finances, and engages in budgeting and forecasting to effectively manage its financial risks.

Operational risk management is given significant attention at HIŠ to ensure the safety, reliability, and efficiency of its production processes. The company follows strict quality control standards and conducts regular inspections to identify and address operational risks. HIŠ also puts an emphasis on workplace safety and provides comprehensive training to employees in order to minimize the risk of accidents and injuries on the job. The focus on operational risk management, helps the company maintain uninterrupted operations and safeguard the well-being of its employees.

Compliance and regulatory risk management are also vital considerations for HIŠ. Operating in a highly regulated industry, the company recognizes the need to adhere to applicable laws, regulations, and industry standards. HIŠ has established a dedicated compliance function responsible for ensuring compliance. The compliance team conducts regular audits, monitors regulatory developments, and implements controls to mitigate compliance risks. By proactively managing compliance risks, HIŠ protects its reputation, maintains stakeholder trust, and avoids potential legal and financial liabilities.

#### **4.8 Key success factors**

When we asked about the company's key success factors, our interviewee said that the company's key values are customers, employees and social responsibility. The company wants to exceed the expectations of their customer by providing the highest quality products, and seeing their customers satisfied is their most valuable success factor.

Employee upskilling and collaboration are important for digitalization in Hrvatska Industrija Šećera. By promoting a culture of digital literacy and providing training programs, the organization can empower employees to utilize digital tools and technologies effectively. Encouraging collaboration and knowledge-sharing among employees fosters teamwork, communication, and innovation. A low employee turnover rate, positive workplace culture, opportunities for career growth, and investments in employee training indicate that HIŠ values its employees and creates a productive and innovative work environment.

Quality control and traceability are vital aspects of digitalization in the sugar industry. By implementing digital tools and systems, the organization ensures consistent quality control measures throughout the sugar production process. This includes tracking and tracing the origin and quality of raw materials, monitoring production parameters, and implementing quality assurance protocols to meet regulatory standards and customer expectations.

Integration of the supply chain is also key. Hrvatska Industrija Šećera enhances supply chain management by connecting stakeholders, including suppliers, farmers, logistics providers, and customers, through digitalization. This improves transparency, coordination, and responsiveness, resulting in a more efficient and agile supply chain.

Automation and optimization play a crucial role, as well. By implementing digital technologies, Hrvatska Industrija Šećera automates and optimizes various processes involved in sugar production, such as harvesting, transportation, processing, and packaging. This leads to increased operational efficiency, cost reduction, as well as improved productivity.

Lastly, being socially responsible and maintaining the highest standards in environmental protection is another factor that emphasizes a company's success. Hrvatska Industrija Šećera uses digital solutions to monitor and optimize energy consumption, waste management, water usage, and other environmental factors associated with sugar production. This helps minimize the ecological impact, improve resource efficiency, and support sustainability goals. Environmental certifications, community partnerships, and employee engagement initiatives serve as evidence of HIŠ's proactive approach to corporate social responsibility.

## **5 DIGITAL TRANSFORMATION IN HILTON GARDEN INN**

Hilton Garden Inn, located in Zagreb, Croatia is a part of the Hilton Worldwide Holdings. It offers many amenities to its guests such as free WIFI, pet-friendly rooms, room service, meeting rooms, fitness center, on-site restaurant, etc. (Hilton Garden Inn Zagreb, n.d.). As part of one of the most internationally recognized hotel management companies, it is well recognized in Croatia too (Zeng, 2021). Hilton Worldwide Holdings Ltd. manages, franchises, owns and rents approximately 6100 hotels in 118 countries around the world (Zeng, 2021).

### **5.1 Industry-specific challenges and opportunities of digitalization**

Tertiary sector is commonly referred to as the service sector and includes hospitality, commerce, transport, real estate activities, etc. (Encyclopaedia Britannica, 2022). Tourism, which is a big source of income for many Croatians, occupies an important part in the sector. Hospitality is therefore a branch of tourism, which employs millions of people and generates billions of dollars to the global economy (Kožić, 2013). Having this in mind, we can conclude that one of the challenges of digitalization in the tertiary sector would be the lack of skilled workers. For example, in Croatia there is a lack of overall workers in the service sector, especially during the summers, which makes it extremely hard to find workers that possess the necessary digital skills to effectively work with new technologies. Additionally, the service sector deals with a vast amount of customer data, which brings in the question of data privacy and security (Wirtz et al., 2018). Organizations need to do all in their power to protect the sensitive information from unauthorized access, cyberattacks and data breaches. All these contribute to another major challenge which is huge investments that are needed. However, digitalization brings its own opportunities to the tertiary sector. Even though digitalization has the potential to disrupt the traditional service business models, that can be viewed as an opportunity for innovation and transformation. This can involve adopting new business models, leveraging emerging technologies, enhancing customer experiences through personalized digital interactions, and outsourcing of work (Lusch, Vargo & O'Brien, 2017). Customer experiences can be enhanced by including personalized marketing, AI-powered chatbots for customer support, etc. (Goel, Kaushik, Sivathanu, Pillai & Vikas, 2022).

### **5.2 Core business processes and business performance**

In our conversation with the interviewee, an employee in Hilton Garden Inn, we have established that their core process is hotel management. To clarify this statement further, we were curious to know what kind of information sets this process in motion. In hotel management, as we were explained, the core process is driven by guest information, information regarding reservations, and finance such as guest' invoices, transactions, reports on income and expenses, etc. This information allows the core process to even

begin in the first place, and it is dependent on it. If you do not, for example, have or are able to obtain the information regarding the reservation and guest information, you do not have a booking, nor are you fulfilling the main purpose of a hotel.

Having all of that in mind it is clear to conclude that one must have a well-designed IT infrastructure to handle the previously mentioned, large amounts of information. Our interviewee said that their IT infrastructure is crucial for their everyday business and their day-to-day operations.

### **5.3 Digital culture**

Hilton Garden Inn has embraced a digital culture characterized by a strong focus on leveraging technology to enhance guest experiences, streamline operations, and drive innovation.

During the initial stages of digitalization, our interviewee noted that the employees exhibited cautiousness rather than hesitation or resistance. This collective caution can be viewed as both a strength and a weakness. On the one hand, their careful approach ensured that technology was implemented thoughtfully, with a strong emphasis on precision and attention to detail. However, excessive caution could potentially hinder progress by slowing down the process. Fortunately, it appears that the employees have now become proficient in utilizing various technologies on a daily basis. Digital tools and solutions have seamlessly integrated into their routines, becoming second nature and contributing to their overall strength as a workforce.

Digital transformation often necessitates changes in company culture and mindset. As mentioned by our interviewee, Hilton Garden Inn actively encourages employees to express their ideas and creative solutions more frequently. This shift promotes a culture of innovation, where employees feel empowered to take risks, learn from mistakes, and contribute to the ongoing digital transformation. Additionally, the hotel has recognized the importance of increasing digital awareness among its workforce. Employees are encouraged to develop an understanding of digital technologies, stay informed about emerging trends, and grasp how these advancements impact the organization's overall business strategy.

By fostering a digital culture that embraces innovation, risk-taking, and continuous learning, Hilton Garden Inn has positioned itself to adapt and thrive in the ever-evolving digital landscape. The hotel's employees have become key drivers of digitalization, leveraging technology to enhance guest satisfaction, optimize operations, and drive sustainable growth.

According to our interviewee, the support and guidance provided by the management during the introduction and ongoing implementation of digitalization have been highly valuable. The interviewee emphasizes the importance of having leaders who openly



acknowledge and discuss the forthcoming changes, demonstrating understanding that immediate and overnight transformations are not to be expected. This approach has created a refreshing and comforting atmosphere for employees, as it allows for a learning curve, adjustment period, and the acceptance of inevitable mistakes. Such an approach is considered normal and essential when venturing into uncharted territories.

The interviewee firmly believes that the smooth progression of the digitalization process within Hilton Garden Inn can be attributed, in large part, to the managerial support and the space given for employees to adapt to the new technologies. This supportive environment has fostered a sense of security, encouraging employees to embrace the changes with confidence and take necessary risks without fear of immediate repercussions. By recognizing the natural learning curve and providing a safe space for experimentation and growth, Hilton Garden Inn has effectively facilitated the successful integration of digitalization into its operations.

In summary, the interviewee greatly values the managerial support exhibited by Hilton Garden Inn throughout the digitalization journey. This supportive approach, characterized by open communication, understanding, and the allowance for a learning process, has played a pivotal role in ensuring the smooth implementation of digital initiatives within the organization.

In addition, a strong collaboration exists between the IT department and other departments within the company. This collaboration is marked by open lines of communication, frequent interactions, and a shared commitment to problem-solving as a team. While decisions regarding IT initiatives are primarily made within the IT department, it is important to note that other departments are encouraged to contribute their ideas and suggestions that involve IT.

The inclusive environment at the company ensures that ideas from all departments are welcomed and taken into consideration when contemplating the implementation of new IT solutions. Although the final decision-making authority lies with the IT department, the perspectives and insights shared by other departments play a valuable role in shaping the overall IT strategy and the selection of appropriate technological solutions.

The collaborative approach fosters a sense of engagement and inclusivity, allowing the expertise and input from various departments to contribute to the overall success of IT projects. This cross-functional cooperation enhances the company's ability to leverage IT effectively, ensuring that the implemented solutions align with the needs and goals of the organization as a whole.

To ensure that its employees possess the essential digital skills and knowledge required to effectively utilize and leverage the information systems and tools, Hilton Garden Inn actively recruits individuals who already possess these qualities. The hotel recognizes the

importance of having tech-savvy employees from the outset and strives to attract candidates who demonstrate proficiency in digital technologies.

However, Hilton Garden Inn's commitment to fostering digital competence goes beyond the initial hiring process. The company also invests in the ongoing education and development of its employees. Recognizing that technology evolves rapidly, and new digital advancements continually emerge, Hilton Garden Inn understands the significance of equipping its workforce with the necessary skills to adapt and thrive in a digital environment.

Through various training programs, workshops, and learning opportunities, Hilton Garden Inn supports its employees in enhancing their digital proficiency. These initiatives aim to ensure that employees are up to date with the latest technological trends, proficient in using information systems, and capable of leveraging digital tools to drive operational efficiency and guest satisfaction.

By combining a strategic approach to recruitment and a commitment to continuous learning, Hilton Garden Inn cultivates a workforce that is equipped with the digital competencies needed to excel in their roles. This investment in employee education reflects the hotel's dedication to staying at the forefront of digital innovation and delivering exceptional guest experiences.

#### **5.4 Digital transformation strategy**

Every digital transformation must have a predefined mission and vision statement in order to be successfully implemented. Hilton's vision statement, that can be found on their official website, goes as follows: "To fill the earth with the light and warmth of hospitality by delivering exceptional experiences-every hotel, every guest, every time" (Hilton, n.d.). Their mission statement, as well found on their website, is: "To be the most hospitable company in the world by creating heartfelt experiences for guests, meaningful opportunities for Team Members, high value for Owners and a positive impact in our Communities" (Hilton, n.d.).

Six values define Hilton, and they are hospitality-delivering exceptional experiences for their guests; integrity-always doing the right thing; leadership-leaders in both the industry and the community; teamwork-team players whatever they do; ownership-owners of their actions and decisions; now-operating with urgency and discipline (Hilton, n.d.).

In 2022, Hilton released a strategy along with their 2030 goals. Travel with Purpose is Hilton's Environmental, Social and Governance (ESG) strategy to create a more responsible travel and tourism globally (Hilton, n.d.). Environmental part is focused on reducing water usage, managed portfolio emissions, franchised portfolio emissions, and waste (Hilton, n.d.). Social part is focused on creating five million learning and career growth opportunities, achieving gender parity and ethnic diversity (Hilton, n.d.).

Governance part of the ESG strategy focuses on advocating for public policies and partnering with cross-industry networks (Hilton, n.d.).

Our interviewee from Hilton Garden Inn agrees that a key element for a successful digital transformation is having a well-defined mission and vision statement which lead the company and its employees towards achieving the set goals and continuous improvement.

Hilton Garden Inn follows digitalization by the pre-set Hilton's standards and the results should always reflect the customer and employee satisfaction, according to our interviewee.

To successfully compete with other hotels in the industry, Hilton Garden Inn needed to start their own process of digitalization. Digitalization changed the way guests are booking their stays, communicating with the hotel and are using other hotel services (Personal communication, May 2023). In addition, digitalization enables hotels to improve their operational efficiency and offer personalized guest experience, according to our Hilton Garden Inn source. The process in their hotel was set in motion in order to satisfy the changes in guest expectations and needs and in order to gain competitive advantage and it was started by the management in cooperation with the IT department. Our interviewee has informed us how the guest consumption patterns have been changing in recent years and digital technologies have become an integral part of their everyday lives. Therefore, Hilton Garden Inn has recognized the importance of digital innovations in providing a better guest experience and increasing operational efficiency.

To initiate the process of digitalization, Hilton Garden Inn has invested in the development and implementation of various technological solutions. Some of those solutions include:

- online reservation system, which enables guests to book their stay online, choose between multiple rooms, services and additional options according to their preferences;
- wireless internet connection: providing free wireless internet access to guests allows them to stay connected during their stay and use their devices without any hassle;
- analytical and data tracking through the implementation of appropriate software tools, Hilton Garden Inn can track guest data, preferences, feedback, and habits to create personalized offers and enhance the overall guest experience.

Within Hilton Garden Inn, the management of Information Technology (IT) is a comprehensive process that encompasses various aspects to ensure its effective operation and utilization.

**Project Management:** One crucial aspect is the management of IT projects. This involves setting clear objectives, creating project plans, allocating resources, monitoring progress, and ensuring alignment with timelines and budgets. By implementing project management methodologies, Hilton Garden Inn ensures that IT initiatives are properly planned, executed, and controlled to achieve desired outcomes efficiently.

**Data Security:** Another vital aspect is data security. Hilton Garden Inn places great importance on protecting data and ensuring the confidentiality, integrity, and availability of information. This includes implementing robust security measures such as encryption, authentication, and access controls. Compliance with relevant data protection regulations is also a priority to safeguard sensitive information and maintain legal and ethical standards.

**System Integration:** The integration of various systems is a key consideration for Hilton Garden Inn's IT management. This involves seamlessly connecting and harmonizing different technology systems within the organization, such as hotel management systems, reservation systems, and property management systems. Through effective system integration, Hilton Garden Inn streamlines operations, facilitates data sharing and communication, and enhances overall efficiency.

**Technology Infrastructure:** Hilton Garden Inn recognizes the significance of having a robust and reliable technology infrastructure. This includes establishing a resilient network infrastructure, ensuring high-speed connectivity, and maintaining hardware and software assets to support the organization's IT needs. By investing in modern and scalable technology infrastructure, Hilton Garden Inn enables seamless operations and provides a solid foundation for future technological advancements.

**User Support and Training:** Hilton Garden Inn places emphasis on providing comprehensive user support and training for its employees. This involves ensuring that employees have the necessary skills and knowledge to effectively utilize IT systems and tools. By offering training programs, workshops, and resources, Hilton Garden Inn enables its workforce to maximize the benefits of IT and adapt to evolving technologies.

**Vendor and Stakeholder Management:** Effective management of IT also entails engaging with vendors and stakeholders. Hilton Garden Inn maintains relationships with IT vendors, ensuring timely procurement, maintenance, and support of technology solutions. Additionally, they actively collaborate with internal stakeholders, such as department heads and executives, to understand their specific IT requirements and align technology initiatives with organizational goals.

**Continuous Improvement:** Hilton Garden Inn recognizes the dynamic nature of technology and strives for continuous improvement. This involves staying updated with emerging trends, evaluating new technologies, and assessing their potential for enhancing guest experiences, optimizing operations, and driving innovation. By embracing a culture

of continuous improvement, Hilton Garden Inn remains at the forefront of technological advancements and ensures its IT strategies align with the organization's evolving needs.

Overall, Hilton Garden Inn adopts a comprehensive approach to IT management, encompassing project management, data security, system integration, technology infrastructure, user support, vendor and stakeholder management, and a commitment to continuous improvement. By effectively managing IT, Hilton Garden Inn enhances operational efficiency, improves guest experiences, and maintains a competitive edge in the ever-evolving digital landscape.

The hotel has implemented outsourcing for certain business processes that require high levels of digitalization. For instance, they use external applications supported by external providers to manage reservations. This approach allows them to take advantage of modern technologies and benefit from their partners' expertise.

One of the best examples of how Hilton Garden Inn in Zagreb aligns the process of digitalization with their services, is the loyalty program offered-Hilton Honors. Hilton Honors utilizes various technologies in order to enhance the customer experience and streamline operations. This membership program is designed to reward and recognize the loyal guests. It allows individuals to earn points for their stays at Hilton properties, which can then be redeemed for various benefits and rewards. Digitalization plays a significant role in enabling the seamless functioning of this program. Hilton Honors platform is accessible through a user-friendly mobile application and website. These digital channels provide a convenient way for members to access their accounts, view their point balances, make reservations, and manage their stays. The platform leverages technology to deliver a user-centric experience, ensuring that members can easily navigate through the program's features.

One of the key aspects of Hilton Honors' digitalization is the integration of personalized services and offerings. Through data-driven insights and advanced analytics, Hilton can understand members' preferences, stay history, and behavior patterns. This information enables the program to offer tailored recommendations, exclusive promotions, and personalized experiences to its members. For example, members may receive customized offers for room upgrades, special amenities, or unique experiences based on their past stay preferences. This personalized approach enhances customer satisfaction and fosters a deeper sense of loyalty.

Digitalization also facilitates a streamlined and efficient booking process. Through the Hilton Honors platform, members can make reservations directly, bypassing traditional intermediaries. This not only saves time but also allows Hilton to provide a more seamless booking experience with real-time availability updates and instant confirmations. By leveraging technology, the platform integrates with Hilton's global reservation system, ensuring accuracy and efficiency in managing bookings.

Furthermore, Hilton Honors utilizes digital channels for communication and engagement with its members. The platform enables two-way communication, allowing members to provide feedback, request assistance, and receive updates. This open communication fosters a sense of transparency and trust, enabling Hilton to address any concerns promptly and maintain strong relationships with its members.

Another important aspect of Hilton Honors' digitalization is the integration of partnerships and collaborations. Through strategic alliances with various companies, such as airlines, credit card providers, and retail brands, the program offers additional ways for members to earn and redeem points. This ecosystem of partnerships expands the value proposition for members and provides them with a broader range of rewards and benefits.

Although the hotel is currently considering cloud computing services, they have not yet implemented them. The purpose is to explore the potential benefits and evaluate how these services can enhance various aspects of their operations.

To facilitate their daily business processes, Hilton Garden Inn employs a diverse range of software solutions. These applications streamline operations, improve efficiency, and provide value and support by automating tasks, enhancing communication, and enabling smoother workflows.

For marketing and recruitment activities, the hotel utilizes its information system and leverages platforms such as social media. These platforms serve as effective tools for advertising, marketing, and recruitment purposes, allowing the hotel to reach a broader audience and connect with potential guests and employees.

In an effort to become more agile, Hilton Garden Inn has implemented various practices and adjustments in their processes and systems. This includes promoting teamwork and collaboration among different departments, maintaining a flexible infrastructure, adopting continuous integration and delivery practices, and establishing effective feedback mechanisms. These changes enable the hotel to quickly adapt to market changes and provide better services to their guests. The increased agility has also improved collaboration and communication among teams within the hotel, fostering open communication channels, knowledge sharing, and rapid information exchange, ultimately enhancing teamwork and collaboration.

Regarding guest reservations and check-in/check-out procedures, Hilton Garden Inn adheres to Hilton brand standards and utilizes specific applications prescribed by the Hilton group. This ensures efficient management of these processes in line with established guidelines.

To personalize guest experiences and increase customer satisfaction, Hilton Garden Inn leverages data and analytics through their own applications. These applications enable

the hotel to collect and analyze guest data, allowing them to tailor their services and offerings according to individual preferences.

Data quality management is a priority for the hotel, which involves monitoring data accuracy, consistency, and overall quality. Maintaining reliable and accurate data is crucial to support their operations and decision-making processes.

Automation and robotics play a significant role in the housekeeping department at Hilton Garden Inn. Through a specialized application, the hotel tracks room occupancy, guest arrivals, and departures, significantly improving efficiency and productivity in managing room maintenance and cleaning processes.

Digital platforms and technologies primarily serve as advertising tools for Hilton Garden Inn and its offerings. These platforms provide a quick and effective way to reach a large audience, allowing the hotel to effectively promote its brand and increase awareness about its services.

In supply chain management, digital technologies are vital for Hilton Garden Inn. They encompass procurement and inventory management processes, enabling the hotel to rely on digital solutions throughout their operations, including procurement activities.

Although Hilton Garden Inn has not yet explored the use of virtual and augmented reality technologies to enhance the guest experience, they remain open to potential future implementations in this area.

According to the interviewee, when evaluating the level of digitalization at Hilton Garden Inn in Zagreb using Gill and VanBoskirk's four maturity segmentation, they rank as collaborators alongside skeptics, adopters, and differentiators. The interviewee's rationale behind this ranking is based on the existing infrastructure and the presence of knowledgeable employees who possess the necessary skills either acquired prior to joining Hilton or through training during their employment. However, to achieve the differentiators stage, which involves seamlessly blending the digital and physical realms, the interviewee believes that further technological advancements would be necessary.

As collaborators, Hilton Garden Inn in Zagreb is actively breaking down traditional silos and leveraging digital technologies to create a competitive advantage. An example of this is the implementation of the Hilton Honors app and program, which not only provides convenience and personalization for guests but also sets a new trend that deviates from traditional norms in the hospitality industry. By embracing digital solutions, Hilton Garden Inn in Zagreb aims to enhance guest experiences, improve operational efficiency, and stay ahead in a rapidly evolving market.

The interviewee emphasizes that the current level of digitalization positions Hilton Garden Inn in Zagreb as a collaborator, actively embracing digital tools and strategies to

drive innovation and maintain competitiveness. The integration of digital technologies into their operations has allowed them to enhance guest services, streamline processes, and establish a strong brand presence in the market. However, to advance further and become differentiators, the interviewee suggests that Hilton Garden Inn would need to continue adopting and implementing cutting-edge technologies that bridge the gap between the digital and physical realms, creating a seamless and immersive experience for guests.

## **5.5 Creation of business value**

In order to adapt to digitalization and market trends, Hilton Garden Inn recognized the need to modify its business model to better align with the evolving digital landscape and changing guest preferences. The hotel industry has witnessed significant shifts in consumer behavior, with guests increasingly relying on digital technologies as part of their everyday lives. To stay competitive and meet the needs of modern travelers, Hilton Garden Inn embraced digital innovations and made strategic changes to its business model.

One of the key modifications was the adjustment of the value proposition. Hilton Garden Inn focused on enhancing the guest experience by providing personalized services and streamlining the online reservation process. Recognizing the importance of convenience and efficiency, the hotel prioritized a seamless and user-friendly online booking system, allowing guests to easily select rooms, services, and additional options based on their preferences. By adapting the value proposition to cater to digital environments and changing guest expectations, Hilton Garden Inn aimed to deliver a superior and tailored experience.

The transformation also encompassed the value chain. Hilton Garden Inn made significant investments in digital sales channels and integrated hotel management systems. This integration allowed for automated reservation and payment processes, improved inventory and resource optimization, and faster, more efficient service delivery to guests. By enhancing digital capabilities and streamlining operations, Hilton Garden Inn sought to create a seamless and interconnected value chain that delivers enhanced value and efficiency throughout the guest journey.

Regarding the revenue model, Hilton Garden Inn's adaptation to digitalization involved exploring various revenue streams. With the digital transformation, the hotel aimed to increase revenue by attracting and retaining guests through personalized experiences and efficient online booking processes. By leveraging technology, Hilton Garden Inn could optimize pricing strategies, offer customized packages, and create additional revenue opportunities through ancillary services or partnerships.

Overall, Hilton Garden Inn's response to digitalization and market trends involved aligning its business model with the changing needs and expectations of guests in a digital



age. Through personalized experiences, streamlined processes, and the integration of digital technologies, the hotel aimed to deliver enhanced value, operational efficiency, and a superior guest experience.

To say that digitalization has brought them business value, would be an understatement for our interviewee. The above-mentioned online reservation system, mobile apps, personalized services, etc., they all improved user experience and satisfaction which means an increase in business value. Another component of business value to them is the employee satisfaction, which is enriched through the introduction of digital tools and technologies which improve work processes, automate tasks, and provide employees with tools for more efficient job performance.

## **5.6 IT governance**

In the subchapter 5.2., we have mentioned the large amounts of information that fuel the core process. Having all of that in mind it is clear to conclude that one must have a well-designed IT infrastructure to handle the previously mentioned, large amounts of information.

Our interviewee said that their IT infrastructure is crucial for their everyday business and their day-to-day operations. Hilton Garden Inn Zagreb architecture, according to our interviewee, consists of:

- applications and software which enable the execution of business functions, such as reservation systems, guest management, financial management, and others;
- databases and data management systems that support the storage, management, and access of organizational data;
- network infrastructure, including routers, switches, wireless networks, and other communication devices that facilitate data transfer between different computer systems and users;
- physical equipment such as computer servers, workstations, data storage devices, and other peripheral devices that support the operation of IT systems.

Additionally, their IT infrastructure consists of:

- hardware resources such as servers, workstations, laptops, and mobile devices used for executing applications and processing data;
- networks-this includes local area networks (LAN), wireless networks (WLAN), wide area connections (WAN), and other network components that enable the connection of computer systems and data transmission;

- data centers: infrastructure for storage, management, and processing of the data.

Even though our interviewee was not allowed to disclose their specific IT principles, we were able to find out that they focus mostly on the safety, reliability, and all else in accordance to Hilton brand standards. Their IT principles are set to support business processes, protect the data and other assets against multiple sorts of attacks, etc.

The decisions about the IT investments within Hilton Garden Inn Zagreb makes the general manager in accordance with the IT manager. So, the general manager will have the upper hand when it comes to the final decisions, however, the IT manager is there to propose new investments and decide, as well, if the investment is even necessary. When asked how they know which IT investments to make and to which they should allow priority, we have gotten a simple answer: they see if the IT investment follows the Hilton brand standards and the one which follows it and highlights those standards the most is the one that should be prioritized.

### **5.7 Risk mitigation**

Hilton Garden Inn has implemented a robust system for managing information system risks, aligning with the requirements set by the Hilton Group. To safeguard its IT infrastructure and reduce potential hazards, the business places a high priority on the usage of cutting-edge technologies. This system has a number of safeguards and protocols designed to protect the availability, confidentiality, and integrity of information.

Minimizing risks is a shared responsibility within Hilton Garden Inn. All employees who utilize IT systems play a vital role in recognizing and mitigating potential threats. By promoting a culture of security awareness and providing comprehensive training, Hilton Garden Inn ensures that its workforce remains vigilant and takes proactive measures to minimize risks.

The identification of threats and the appropriate response in case of need involve multiple departments within Hilton Garden Inn. While the IT department takes the lead in assessing and addressing technical risks, other departments also play a role in identifying potential vulnerabilities and contributing to risk management efforts. This collaborative approach enables comprehensive risk identification and mitigation across the organization.

Hilton Garden Inn upholds the brand standards established by Hilton and goes above and beyond to secure guest information when it comes to maintaining the security and privacy of visitor data, especially in light of growing concerns over cyber threats and data breaches. The organization invests in advanced software solutions for data defense and preservation. This entails effective cybersecurity safeguards including firewalls, intrusion detection systems, access controls, encryption, and regular security audits. In order to

give visitors a safe and secure environment for their personal information, Hilton Garden Inn constantly reviews and updates its security procedures.

In addition, Hilton Garden Inn abides with pertinent data protection laws to preserve the private rights of its visitors. The company makes sure that guest data is gathered, kept, and processed in a responsible and secure manner by putting into place strict data handling rules and processes. The Hilton Garden Inn's overall strategy for gaining the trust and delight of its guests includes a commitment to data privacy as a key component.

Hilton Garden Inn exhibits its dedication to protecting guest information and upholding a high degree of security through these extensive efforts in an increasingly digital and linked environment. Hilton Garden Inn works to give visitors a secure environment during their stay by putting a high priority on risk management, investing in cutting-edge technology, cultivating a culture of security awareness, and adhering to industry norms and regulations.

To ensure security and protect member data, Hilton Honors employs robust cybersecurity measures. This includes encryption techniques, secure payment gateways, and compliance with industry standards and regulations. By prioritizing data security, Hilton maintains the trust and confidence of its members, allowing them to engage with the platform with peace of mind.

## **5.8 Key success factors**

Hilton Garden Inn recognizes that its key success factors lie in both guest and employee satisfaction. By prioritizing these two crucial aspects, Hilton Garden Inn has been able to establish a strong reputation and maintain a loyal customer base. This focus on satisfaction encompasses various elements, including exceptional service, personalized experiences, and a supportive work environment. Through these key success factors, Hilton Garden Inn has managed to thrive in the highly competitive hospitality industry.

A crucial aspect of successful digitalization for Hilton Garden Inn is the enhancement of the guest experience through the implementation of various digital solutions. The user-friendly platform, Hilton Honors, and the mobile application play a significant role in achieving this. These digital tools offer benefits such as room customization options, virtual keys, and online check-in, enabling guests to have a convenient and personalized stay. Hilton Honors serves as a bridge between the digital and physical worlds, providing personalized recommendations, real-time assistance, and effective communication channels to ensure guests have a memorable and satisfying experience.

The hotel's successful digitalization efforts can also be attributed to its well-designed technological infrastructure. Hilton Garden Inn relies on essential hardware resources such as servers, workstations, and laptops, as well as robust networks like LAN, WLAN, and WAN. The secure management of this technological infrastructure is crucial for

safeguarding customer information and ensuring privacy, as it is recognized that without proper data protection, the business would be at risk.

Furthermore, strong leadership from top management plays a pivotal role in driving the digital transformation journey. They create a sense of urgency for embracing transformational changes and set the example for behavior that all employees should adopt and emulate. This key success factor fosters employee engagement and encourages collaboration between different units, all focused on achieving digitalization objectives.

Having a digitally diverse and skilled workforce is another crucial factor for success. Hilton Garden Inn actively recruits digitally proficient staff and provides training and workshops to further develop their talents and capabilities. Empowering employees to work with new technologies and encouraging them to experiment contributes to the successful digitalization process at Hilton Garden Inn.

Collaborations and partnerships are worth mentioning as they contribute to advancing digitalization efforts and streamlining the process. As part of the Hilton Group, Hilton Garden Inn benefits from collaborations with industry leaders such as IBM, Cisco, Google, and others. These collaborations enable the hotel to access cutting-edge technologies, share best practices, and drive continuous improvement in its digital initiatives.

Lastly, the utilization of analytics and insights derived from guest data analysis, operational metrics, and market trends is identified as a key success factor. Extracting valuable insights from data helps Hilton Garden Inn make informed decisions, identify areas for improvement, and capitalize on opportunities for growth.

Overall, these key success factors, including guest-centric digital solutions, robust technological infrastructure, strong leadership, a skilled workforce, collaborations, and data-driven decision-making, contribute to Hilton Garden Inn's successful digitalization journey according to our interviewee.

## **6 DIGITAL TRANSFORMATION IN RIT CROATIA**

RIT Croatia is a private higher education institution that offers students undergraduate and graduate programs. They have two campuses in Croatia, the main campus in Zagreb and a campus in Dubrovnik. In Zagreb you can choose to study either information technology or international business, while in Dubrovnik you can choose from hospitality and tourism to information technology. RIT Croatia is a part of the American university, Rochester Institute of Technology, and as such offers their students two degrees, an American and a Croatian one.

RIT Croatia's values, as stated on their official webpage, are excellence, global mindedness, inclusiveness, integrity, open-mindedness, team-spirit and trust.

As RIT Croatia has undertaken the necessary steps to begin their process of digitalization and was one of the fastest colleges in Croatia to shift to a digital environment during COVID-19 outbreak, we interviewed Ms. Ivona Labas, the director of Strategic Development ITS and Facilities, to get more insight into their operations.

## **6.1 Industry-specific challenges and opportunities of digitalization**

The quaternary sector is the part of the economy that involves the creation and dissemination of knowledge and information. This includes activities such as research and development, education, and professional services (Toffler, 1980; Florida, 2002).

The quaternary sector is becoming increasingly important in the modern economy as technological advances and globalization have increased the demand for knowledge and information work. The sector is seen as a key driver of innovation and economic growth (Foray & Raffo, 2014). It is characterized by high levels of specialization and expertise, as well as a focus on intangible assets such as intellectual property and human capital. It often involves work that is highly creative and innovative and requires advanced education and training (Foray & Raffo, 2014).

Some of the challenges facing this sector would be talent acquisition and retention, integration of legacy systems, constant upskilling and reskilling of the workforce, etc.

Digitalization requires a workforce with specialized skills in areas such as data analysis, artificial intelligence, and cybersecurity. The quaternary sector faces a challenge in attracting and retaining top talent with these skills, as competition for such talent is fierce (Sakhare, 2023). Additionally, there is a need for continuous upskilling and reskilling of the workforce. As technology rapidly evolves, employees must stay updated on the latest tools and techniques to remain competitive. This would mean that a significant investment in training and development programs is needed and we are all aware how costly that can be for companies. Recent outbreak of the COVID-19 has proven how important it is for employees of the quaternary sector to be up to date. For example, some educational institutions took less time to shift from the real-life, on-site environment to digital environment and platforms. Institutions that were quick were probably the ones constantly working on training their employees, as we will see further on. Moreover, digitalization has led to an increase in remote work, which presents its own set of challenges such as communication barriers and lack of face-to-face interaction, and similar. Lastly, as the quaternary sector includes creative professionals who create digital content, such as graphic designers, web developers, etc., the question of copyright, intellectual property, human capital etc. arises.

In contrast, digitalization has brought the quaternary sector some industry-specific opportunities. Digital technologies have enabled the development of new products and services in the quaternary sector, such as software and digital platforms. These new revenue streams can help organizations diversify their offerings and increase revenues (Sakhare, 2023).

Previously mentioned remote work brings many benefits for the employees, some include working while on a vacation, less time and resources spent on transportation, etc. Additionally, new freelancing platforms have emerged. These freelancing platforms enable, for example, educators, or data analysts to offer their services online for their quoted price and get hired by complete strangers to do the job. In such a way more income can be generated, and more “unimportant” work can be outsourced.

## **6.2 Core business processes and business performance**

As with any organization, RIT Croatia has several, core business processes that are critical to its success. Further one may find the six primary business processes of RIT Croatia and their importance to the institution.

Firstly, admissions and enrollment management are a critical process for RIT Croatia. The institution must continually recruit and enroll new students to maintain its student body and ensure its financial stability (RIT Croatia, n.d.). This process includes identifying potential students, reviewing applications, and making admissions decisions. To attract the best students, RIT Croatia must promote its programs and services effectively through targeted marketing campaigns and other outreach efforts.

Secondly, academic management is another essential process at RIT Croatia. This process involves managing the institution's academic programs, curriculum, and faculty to ensure high-quality education for its students (RIT Croatia, 2016). Scheduling classes and ensuring that students are taking the required courses to meet graduation requirements is also part of this process. Maintaining academic standards is crucial to RIT Croatia's reputation and the success of its graduates.

Thirdly, student services are another important business process for RIT Croatia. The institution must provide support services to its students to ensure their success and well-being. This process includes offering academic support services such as tutoring, counseling, and advising, as well as extracurricular activities such as clubs and sports teams (RIT Croatia, n.d.). By providing a comprehensive range of student services, RIT Croatia can help its students achieve their academic and personal goals.

Fourthly, financial management is a crucial process for RIT Croatia. This process involves managing the institution's budget, accounting, and financial reporting. Financial management is essential to ensuring that the institution can operate effectively and remain financially stable (RIT Croatia, 2016). Effective financial management allows RIT

Croatia to invest in its programs and services, maintain its facilities, and provide competitive salaries and benefits to its faculty and staff.

Fifthly, human resources management is another core business process at RIT Croatia. This process involves managing the institution's workforce, including hiring, training, and performance management. Effective human resources management is essential to ensuring that the institution can attract and retain talented faculty and staff (RIT Croatia, 2016). By investing in its workforce, RIT Croatia can provide high-quality education and support services to its students.

Finally, marketing and public relations is another core process for RIT Croatia. This process involves promoting the institution's programs and services to prospective students, parents, and other stakeholders (RIT Croatia, n.d.). Effective marketing and public relations help RIT Croatia to attract new students and maintain its reputation as a high-quality institution.

Summed up, RIT Croatia has six primary business processes that are critical to its success. These processes include admissions and enrollment management, academic management, student services, financial management, human resources management, and marketing and public relations. By managing these processes effectively, RIT Croatia can provide high-quality education and support services to its students, attract and retain talented faculty and staff, and maintain its financial stability and reputation as a leading higher education institution in Croatia.

When it comes to RIT Croatia's business performance, we can look at the numbers provided on their page as well. According to the RIT Croatia Annual Report for 2020, the school has continued to perform well in terms of business operations. In the 2019/2020 academic year, the school had a total enrollment of 675 students, which represents a 9% increase from the previous year. The majority of these students were enrolled in the undergraduate programs, which include programs in web and mobile computing, hospitality and tourism management, and international business.

In terms of financial performance, RIT Croatia's revenues for the 2019/2020 academic year were approximately 21 million Kuna (or roughly 2.8 million euros). This represented an increase of 4% compared to the previous year. The majority of the school's revenues came from tuition and fees, which accounted for 92% of total revenues. RIT Croatia's financial performance has been aided by the fact that the school has been able to maintain a strong reputation and attract students from around the world. In particular, the school has been successful in attracting students from the United States, where the RIT brand is well known. The school has also established partnerships with a number of local and international businesses, which has helped to create opportunities for students and faculty members.

Furthermore, RIT Croatia has been recognized for its academic excellence and has received numerous awards and accreditations. For example, in 2020, according to Rotondo and their webpage, the school received accreditation from the Association to Advance Collegiate Schools and Business (AACSB) for its business programs. This accreditation recognizes that the school's programs meet rigorous academic standards and prepares students for successful careers in their respective fields.

### **6.3 Digital transformation strategy**

As previously mentioned, RIT Croatia is a part of the much larger community and a university, Rochester Institute of Technology which is based in Rochester, NY in the United States of America. However, RIT Croatia itself is a fairly small organization, which according to our interviewee, had no need for large-scale digitalization processes in the past.

To achieve a successful digital transformation, an organization needs to have a defined vision, mission, and strategic goals.

RIT Croatia's official mission and vision statement is: "Through future-ready education and research excellence, we add value to society. We inspire a growth mindset, preparing individuals to become leaders, lifelong learners and responsible global citizens" (RIT Croatia, n.d.).

According to dr.sc. Irena Guszak, the associate dean of RIT Croatia, their strategic plan is made taking in mind their four key pillars, which are the right people, top quality programs, research, and high standards.

When it comes to the first pillar, people, RIT Croatia has defined 6 goals. The first three goals are about enhancing the internationalization of their student body, their student retention rate and student satisfaction. The last three goals are to foster a talented and dedicated faculty and staff community, expand the presence of international faculty and industry adjuncts, and to strengthen alumni engagement. In the next second pillar, programs, they have four goals stated. RIT Croatia will try to attain their university status in the following years, launch their new undergraduate and graduate degree programs, establish a learning program which will last a lifetime, and increase experiential learning opportunities. In the third pillar, research, there are only two goals: to increase research output and quality. Lastly, in the fourth pillar-standards, there is a goal to attain the advanced phase of the quality assurance system.

Shortly after RIT Croatia was founded, in the early 2000s, the first efforts in digitalization were undertaken, our interviewee explains. Back then in those days, they had started working on their own custom Customer Relationship Management (CRM) solution/database that helped them create a bridge and connect Croatian legislative requirements and US systems that were already set in place at RIT. This custom CRM



solution has been in place until today and is annually updated to reflect current organization needs. CRM refers to a set of strategies and technologies used by businesses to manage and analyze their interactions with customers, their needs, and behaviors, in order to provide more personalized and effective customer service (Xu, Yen, Lin & Chou, 2002).

The process of digitalization was initiated on the top management level, which means by the senior leadership; they are also those who lead the process of digitalization. Our interviewee states that some parts of digitalization were driven by the legislative needs, while some were also a requirement of the RIT Rochester compliance side.

In 2011, our interviewee points out, RIT Croatia started another larger digitalization project where they had an intention to automate their finance and human resources processes. These processes were previously, until then, handled in a manual way. This endeavor has resulted in the implementation of new finance/accounting software in 2012.

When it comes to the current situation and the future, our interviewee states how they are in the process of evaluating their long-term needs and it is very likely that they will be looking into a new CRM solution within the next few years and that will be their next digitalization venture.

It is very important to note that RIT Croatia and therefore, our interviewee, is aware how digital maturity is a cyclical process in a sense that one can never be “digitally mature” and end their process of digitalization. She believes that their organization is currently in the development phase of digitalization, which means that they are expecting to work on the new CRM solution and are aware that this will transform their business process. Even though digitalization is a process that never stops, she feels like they can oftentimes rest until the next digitalization venture. For example, in 2016 they were not undertaking any new steps, however, the change in trends and development of newer technology opened up new opportunities that have resulted in new digitalization efforts.

If you are a student at RIT Croatia, or any RIT college as a matter of fact, if asked about digital platforms you will immediately think of MyCourses and Student Information System (SIS). These two systems are, as our interviewee confirms, used by all RIT Global Campuses. We wanted to know whether these solutions were created or purchased and were informed how the main Rochester campus is in charge of purchasing and implementing the systems. Therefore, they were the ones that have purchased the solution and ordered the implementation on all campuses. The Student Information System is a part of Oracle’s Peoplesoft solution and MyCourses, as she states, is another off the shelf solution.

Usage of these systems on all campuses comes in handy as on Student Information System, you can see all the courses offered on all RIT campuses. By exploring the courses, you may find yourself interested in an online course offered, for example, online

from Rochester campus and enroll. The Student Information System is used for registering your courses, withdrawing/dropping some courses, viewing your GPA, requesting some formal papers, following your progress, etc.

MyCourses serves as a central hub for students and faculty, facilitating essential interactions and information exchange. It functions as a platform where professors disseminate vital course materials such as mandatory readings, assignments, exercises, and grades, while students can conveniently access these resources, monitor their progress, and utilize the provided materials. Furthermore, MyCourses offer a chat for students where they can send each other messages on different topics; it offers a place for discussion, within a selected course, that either a student or a professor can start, as well. Following up and offering a replica to someone's started discussion was oftentimes seen as a way of being active in class and therefore encouraged students to use the platform, while at the same time offering the possibility of participating to those students who are more afraid to speak in larger crowds.

#### **6.4 Digital culture**

RIT Croatia has embraced a digital culture and has been using technology to enhance its educational offerings and operations, as established before. The school has been investing in digital tools and resources, such as Learning Management Systems (LMS), virtual classrooms, and online libraries, to provide students with a more engaging and interactive learning experience (RIT Croatia, 2021a). The adoption of digital technologies has allowed the school to expand its reach beyond physical boundaries and offer online courses and degree programs to students from around the world (RIT Croatia, 2021b). Through deliberate efforts, RIT Croatia fosters a culture that encourages students and faculty to adopt a digital mindset and attain digital literacy. The college, known for its American education system, goes beyond traditional coursework by offering a comprehensive range of courses and workshops dedicated to developing digital skills. These include specialized workshops in data analytics, digital marketing, cybersecurity, and more, enabling students to acquire the essential competencies needed to thrive in the digital era and stand out in the competitive job market.

An integral factor that sets RIT Croatia apart from other private colleges in Croatia is its unwavering commitment to cultivating a digital culture and proficiency. During the recruitment process, prospective students are informed of the college's dedication to preparing them for real-world challenges and sharpening their digital skill set. This commitment to nurturing students' digital capabilities serves as a compelling point of differentiation, attracting individuals seeking an institution that shares their enthusiasm for fostering digital proficiency and empowering their future success.

Moreover, RIT Croatia has implemented various digital initiatives to streamline its operations and improve its efficiency. For instance, the school has implemented an

electronic document management system, which allows for easy and efficient sharing and storing of documents and records (RIT Croatia, 2021a). This has reduced the school's dependence on paper-based processes and improved its environmental sustainability efforts.

These previously mentioned undertakings are a huge wind in the back for the students and show them where RIT Croatia's faculty stands on that topic. Receiving recognition for fostering a robust digital culture is highly commendable, particularly when it comes from both former students and current faculty members.

The support and encouragement that comes from the top management and leadership is felt throughout, and that is why our interviewee also feels that there is no resistance amongst the employees now. In the past, the situation was a bit different though; RIT Croatia's management felt more resistance then. However, in the past ten years, digitalization has become a "normal" process and that, according to her, helps with understanding the importance of learning new things and adapting to new systems. It is crucial for employees to recognize the organizational benefits resulting from digitalization implementation, as this cultivates their willingness to wholeheartedly collaborate. Moreover, RIT Croatia is in recent years more focused on including all the employees in the digitalization process, granting them a sense of ownership and consequently reducing resistance levels.

Collaboration between the information technology department and the rest of the departments is another important factor in creating a strong digital culture. Transparency within the organization supports the collaboration. Our interviewee is confident in the transparency they have within the organization, as it helps with the communication when you are a rather small organization. Other departments are always included in the IT decisions that influence their work; for example, all computer purchases need to be aligned with academic program requirements. This is the reason why in one lab you may find Microsoft computers, and mostly IT students in that lab, while in the other lab you can find Mac computers, which are more useful to business students.

## **6.5 Creation of business value**

The creation of business value is a crucial aspect for organizations navigating the digital landscape and adapting to market trends.

To cope with digitalization and market trends, the interviewees were asked if they had to change their business model and the reasons behind it. They acknowledged that digitalization was a key factor influencing market trends and necessitated a reevaluation of their strategic planning. One interviewee mentioned that digitalization was among the factors that led to the formulation of their Strategic Plan for the 2019-2022 period, aligning their business model with emerging technologies and customer demands.

Currently, they are in the final stages of publishing a new Strategic Plan for the upcoming five years, highlighting their commitment to adapting to the digital landscape.

The interviewee recognizes that digitalization has had an influence on their organization's value proposition, value chain, and revenue model (Interviewee, personal communication, April 2023). Although specific details about these elements were not provided, it is evident that digitalization has prompted the organization to reassess and potentially redefine how they create, deliver, and capture value in the marketplace. Further analysis of these aspects would require a more in-depth exploration of the organization's business model.

According to our interviewee, digitalization has undeniably brought significant business value to the organization. Some of the key manifestations of this value include:

1. **Decreased workloads:** Through digitalization efforts, employees were able to shift their focus from mundane administrative tasks to more meaningful activities, such as enhancing customer satisfaction (Interviewee, personal communication, April 2023). This shift in workload allocation has allowed for greater efficiency and improved employee engagement.
2. **Improved decision-making:** Digitalization has provided the organization with access to more accurate and timely information, enabling informed decision-making processes (Interviewee, personal communication, April 2023). The availability of data-driven insights has enhanced the organization's ability to respond swiftly to market dynamics and make strategic choices with confidence.

## **6.6 IT governance**

As discussed at the beginning of the work, IT governance is one of the integral parts of enterprise governance and it ensures that an organization's IT sustains and extends the organization's strategy and objectives (De Haes & Van Grembergen, 2004). In the case of RIT Croatia, as we find out from our interviewee, IT governance, in its true sense, is handled at the Rochester level and it is then on being scaled down on global campuses.

The decisions regarding the IT within the RIT Croatia institution are made between Ms. Labas, who is the Director of Strategic Development ITS and Facilities and our interviewee, and the Dean. All of the major infrastructure decisions are made between her, the Dean and the appropriate department at RIT Rochester. However, in case of smaller processes, for example, local equipment investments, these would be handled locally between the Dean and Ms. Labas in accordance with IT managers, Academic leadership, and Rochester colleagues as well, if necessary.

While discussing how her and the Dean know which IT investments should be made and which of those investments should be prioritized, Ms. Labas revealed that they listen and

follow the needs of their academic programs. So, if the proposed investment will enrich and help the academic program, it will probably be made. She also revealed that generally speaking, classes and program delivery come first, so therefore, those IT investments will probably be prioritized.

## **6.7 Risk mitigation**

Risk mitigation and risk management processes are not something that is a focus of RIT Croatia. Risk management processes at RIT are centralized and overseen by the main campus in Rochester. While individual departments are accountable for managing risks within their purview, decision-making and actions pertaining to risk management are handled at the Senior Leadership level, according to our interviewee.

Additionally, RIT Rochester implements a comprehensive set of protocols and processes to ensure the robust security of all intellectual property. These measures are diligently managed to safeguard valuable assets against unauthorized access or misuse.

To ensure the security and confidentiality of student data within the information system at RIT Croatia, they have implemented stringent security access protocols. These protocols grant access only to the specific information that is essential for particular job roles, minimizing any unnecessary exposure. In addition to complying with the General Data Protection Regulation (GDPR), we also adhere to the data security regulations outlined by the Family Educational Rights and Privacy Act (FERPA). These measures collectively safeguard student data and maintain compliance with relevant data protection guidelines.

As we cannot obtain a lot of information on RIT Croatia's risk mitigation policy, we explore the Information Access and Protection (IAP) Standard. The IAP standard is used to properly handle information at RIT ("Information Handling Resources", n.d.). There are four categories of information within the standard: private, confidential, internal and public. Private information is confidential information that might be used for identity theft, such as Social Security Number, driver's license numbers, financial account information, etc. ("Information Handling Resources", n.d.). Confidential information regards to information that is on a need-to-know basis and may be accessed only with specific authorization ("Information Handling Resources", n.d.). Some examples of confidential information are university identification numbers, employee personnel information, employee and student health information, educational records, etc. Internal information is information that is restricted to RIT faculty, staff, student, alumni, contractors, volunteers, and business associates for the conduct of RIT's business; such as online building floor plans, specific library collections, etc. ("Information Handling Resources", n.d.). On the other hand, public information can be accessed or communicated without any restriction and authorization. The mentioned Standard applies to all that access RIT Information Resources ("Information Handling Resources", n.d.).

RIT Information Resources include but are not limited to: RIT-owned or leased transmission lines, networks, wireless networks, servers, Internet connections, computers; information owned by RIT or used by RIT under a license or a contract (electronic media, software, paper, etc.); personal computers, servers, wireless networks, mobile devices, and similar (“Information Handling Resources”, n.d.).

RIT has an Office of Compliance and Ethics (OCE) which administers the Enterprise Risk Management (ERM) program. At RIT’s webpage we have access to the 2021 multi-year report. Some of the key enterprise risks reported are Covid-19, cybersecurity and data protection, enrollment, external funding, etc. Cybersecurity and data protection risk is defined in the report as the risk that arises from the ability to protect data and manage access of different various end users to the network and keep pace with security threats which presents many security challenges that may end in fraud, financial and property loss, data theft, damage to reputation, etc. (Rochester Institute of Technology, 2021). Primary risk owners here are Senior Vice President, Finance and Administration, Associate Vice President and Chief Information Officer, and Information Security Officer. There are also several risk status rationales stated in the report: due to the increased usage of mobile devices to access, process and store RIT data there is increased risk of exposing and losing the data, and risk of more network-based attacks; the fast-increasing number of cyber threats, as well as their well-thought execution, make it harder for RIT to successfully protect information assets; there is also a growing threat of action and fines against organizations for data breaches by regulators, etc. (Rochester Institute of Technology, 2021).

## **6.8 Key success factors**

RIT Croatia has several key success factors that contribute to its achievements regarding digitalization. These factors, communicated by our interviewee, can be summarized as follows:

- The right vision and appropriate leadership: Having clear-defined vision and strong, appropriate management leading your digital transformation was and still is an important part of a successful RIT digitalization. The dean, with the help of Ms. Labas, sets the example on how an employee of RIT Croatia, as well as the students, should view the digitalization and to what lengths should they embrace it. They encourage its progression and empower others to embrace it too.
- Technological infrastructure: Having a strong and reliable technology setup is crucial for successful digitalization. This includes ensuring fast internet access, adequate hardware and software resources, implementing measures to protect the network, and creating a well-designed IT system.
- Ever-evolving digital skills and competencies: RIT Croatia understands that building digital skills and competencies not just among educators, but among students and other staff is crucial. Successful digitalization without people

competent enough to implement it, does not exist. Thus, as previously mentioned, there are training programs provided in order to enhance digital literacy and ability to use digital technologies and integrate them into the curriculum.

- **Digital Learning Platforms:** RIT Croatia's use of online learning platforms that facilitate virtual classrooms, interactive content, collaboration tools, and course delivery has shown to be one of the key success factors of digitalization. The ease of navigating these platforms (platforms such as MyCourses, Zoom, and similar) as well as its easy access, offer smooth learning experience for students, and make the job a little easier for the professors.
- **International Collaboration:** RIT Croatia's emphasis on international collaboration is another key success factor. The institution fosters partnerships with renowned universities and organizations worldwide, allowing students to engage in global experiences, exchange programs, and joint research projects. This international exposure enriches students' perspectives and equips them with a global mindset, and it brings new innovative ideas that support digital initiatives. Having the ability to let your students compete in different technology-related fairs and similar, fosters the culture of digital innovation. Additionally, collaboration with technology providers, and different online libraries, allows RIT Croatia to maintain the courses interesting and relevant.
- **Industry Relevance:** RIT Croatia recognizes the importance of aligning its programs with industry demands. By staying updated with emerging trends and technologies, the institution ensures that its curriculum remains relevant and prepares students for the evolving job market. This focus on industry relevance enhances graduates' employability and positions them for success in their chosen fields.
- **Supportive Learning Environment:** RIT Croatia fosters a supportive learning environment where students receive individual attention and guidance; ensuring that students receive necessary support in the digital environment. The institution promotes small class sizes, which facilitate interactive discussions and personalized instruction. Faculty and staff members are accessible and approachable, providing mentorship and support to students throughout their academic journey.
- **Security and privacy risk minimization:** Having strong security measures set in place to protect students' and employee's sensitive data, along with institution's private information contributes to successful digitalization. This involves using secure authentication methods, such as the Duo Mobile app, to confirm student's identity while logging into the learning platforms and apps provided by the institution, and similar.
- **Digital Equity and Inclusion:** RIT Croatia ensures equal access to digital resources and opportunities for all of their students. This involves providing the same Mac computers to all the students in the classroom, and providing them in the Lab, a place similar to a library that consists only of Mac computers for work in-between or after classes.

- Data analytics and assessment: RIT Croatia uses data analytics to track and measure student performance and learning outcomes. Thus, enabling informed decision-making and improvement of teaching practices based on evidence.

## **7 DISCUSSION**

This part of the thesis focuses on evaluation and analysis of findings from our research and existing literature. The purpose of our discussion is to interpret our findings and draw meaningful conclusions about how digitalization is used in different sectors and companies. Moreover, to highlight the most important observations and trends related to digitalization. Besides, the goal is to point out the limitations we faced during our research and what are potential implementations of our findings and ideas on how the research can be further extended.

### **7.1 Comparison of described cases**

After conducting a comprehensive analysis of the four selected companies, we have identified a significant difference between the company from the primary sector and the rest of them. There are noteworthy features that are consistently practiced and shared among companies from the secondary, tertiary, and quaternary sectors. However, they were not present in the company from the primary sector due to its underdevelopment that is present in the whole sector.

Furthermore, it is worth noting that since these companies operate in distinct industry sectors and engage in diverse types of businesses, their core operational processes exhibit significant variations. However, amidst these differences, we have discovered several common practices, beliefs, and values that permeate the organizational fabric of the three companies.

One of the pivotal aspects we examined across all companies was their organizational culture. Despite their divergent approaches to conducting business and distinct vision and mission statements, we observed that the digital cultures of the three companies encompassed a set of fundamental and shared characteristics. These characteristics hold immense significance as they shape the work environment for employees and contribute to the overall success of the businesses. While these traits are evident within the three companies under scrutiny, we contend that they are also prevalent in many other successful companies worldwide. However, more importantly, is to mention that the company from the primary sector, Vici Ventus, significantly differs from the other three companies when it comes to the digital culture. Vici Ventus does not have a defined digital culture within the company due to underdevelopment and the absence of digitalization within the company. Therefore, we were not able to collect any relevant data that would interpret and describe the company's culture. Additionally, our interviewee mentioned the fact that most of the companies from the primary sectors lack



the expanded digital culture because it is usually not needed due to the undeveloped digital infrastructure within the sector.

When it comes to the analyzed companies from the secondary, tertiary, and quaternary sectors, there are some digital culture characteristics that were emphasized in all three companies:

- collaboration among departments/cross-functional collaboration
- open communication
- transparency
- shared commitment to problem-solving
- creativity
- knowledge-sharing
- training programs and workshops
- freedom to express ideas and creative solutions
- continuous learning/continuous improvement
- enthusiasm
- feedback from employees
- managerial support and guidance
- focus on leveraging technology
- safe space for experiment and growth
- encouragement of taking risks
- learning from mistakes
- inclusivity

All these characteristics are shared among the three analyzed companies, which is proof of their significance. Based on our research, we concluded that every company should focus on its employees and customer-centricity, as seen in subchapters 4.8., 5.8., and 6.8. where the three companies emphasized the importance of customer and employee satisfaction as one of their key success factors. In today's world, customers are the ones who dictate what should be offered on the market, and that is why most companies

practice customer-centricity methods to create positive experiences and get loyal customers. Thankfully, with the development of new technologies, businesses have a better insight of what customers want, so they can spend less time focusing on that, and spend more time focusing on how to deliver the desired product or service. That is why they put a strong focus on employees, to fulfill customers' wishes in the best possible way.

When it comes to employees, businesses tend to make them feel included, safe, and satisfied, which results in successful business outcomes. Employees are the ones that decide how the business processes will be made, how much effort will they put in the work, and how successful the outcomes will be. Because of that, modern and digitalized companies put a strong focus on making workers feel welcomed and encouraged. Moreover, as mentioned by our interviewees in subchapters 4.3., 5.3., and 6.4., by encouraging and supporting them to express their ideas, potential solutions, enthusiasm, and creativity, companies allow for a learning curve, adjustment period, and acceptance of mistakes. Also, in that way they motivate employees to participate in different workshops and training programs to provide feedback on their environment and share opinions on what could be done better. These are important shared characteristics of digital culture that can be found in subchapters 4.3. and 5.3. Furthermore, companies emphasize cross-functional collaboration, which can be seen in subchapters 4.3., 5.3., and 6.4. It means that they motivate departments to work together and break barriers between them. In that way, businesses can collect more creative ideas and have potentially higher chances of creating desired outcomes that will satisfy customers' needs. Open communication and transparency are just some of many important features when it comes to cross-functional collaboration, and both of them create a refreshing and comforting atmosphere for employees who are provided with a high level of support and guidelines from different departments, including managerial departments, which is described in subchapters 4.3., 5.3., and 6.4. Other than creating a nice atmosphere, they build a safe space for new employees to easily adapt. Additionally, they create an environment where it is okay to make a mistake because the focus is on giving your best and taking chances, and we all know that it is rare to succeed without failing first. Those mistakes are important because businesses can learn from them and perform better in the future. What is more, taking risks is another common practice among these companies, since they are aware that sometimes you need to take a risk to succeed. As explained in subchapters 5.3., and 6.4., in that way, businesses increase their levels of adaptability and agility, making them more flexible and adaptable to constant changes in the market. However, those risks need to be calculated because the line between success and failure is thin. Besides, companies inspire employees to adapt to problem-solving and continuous learning mindsets. By doing so, the employees have the opportunity to focus on the main tasks and activities in order to perform the best they can. On top of that, they are aware that nobody knows everything and that learning new things and improving existing knowledge is perfectly fine, which motivates them to continuously expand their

knowledge and skills to keep up with new technologies. Over and above all, as emphasized in subchapters 4.3., 5.3., and 6.4., companies put a strong focus on acceptance and inclusivity, meaning that anyone with enthusiasm to work and learn new things is welcomed to the company, as long as they focus on innovation, creativity, and problem-solving mindset.

Secondly, we have analyzed companies' digital transformation strategies and the reasons they decided to do it. Although their strategies differ due to differences in their core processes, we have found strategy characteristics that repeat between the three of them. The first thing these companies have in common is the reason they opted for digital transformation, which is described in subchapters 4.4., 5.4., and 6.3. The reason they decided to do a digital transformation is to stay competitive, enhance its market position, and deliver value to its customers. The second mutual decision, which is the most important aspect of every digital transformation, is that their strategies are focused on technology adoption, data-driven insights, streamlined operations, and innovation, which can also be seen in subchapters 4.4., 5.4., and 6.3. These companies were and still are shifting from conventional and time-consuming methods to new digitalized methods by implementing things like new technologies, artificial intelligence, machine learning, data analytics, cloud computing, Internet of Things, etc. These are all important features of digitalization that have to be implemented and developed to stay competitive in the market, no matter what industry sector the business is in. As mentioned above, businesses put a strong focus on customers, and all these technologies allow companies to satisfy customers by improving their predictive models and decision-making processes. Moreover, things like machine learning algorithms and data analytics provide analysis of huge amounts of data, suggestions on how that data should be used, and the creation of data-driven decisions that maximize productivity and efficiency. Not only do these technologies increase efficiency and productivity, but also lower costs, and minimize waste while improving sustainability. Furthermore, it enables them to quickly respond to changes in the market and stay competitive.

Other than adopting and implementing new technologies, an important aspect of their strategy is to align those technologies with business outcomes. That is where IT governance plays an important role. While doing our research we have realized that the companies have different organizational structures and the way they make decisions related to IT. However, our findings from subchapters 4.6., 5.6., and 6.6. show what they have in common is that they encourage IT departments to work with other departments to align IT features with companies' goals and objectives in the best possible way. This means that only the IT department deals with technologies but works with other departments to understand what the best way is to use those technologies to maximize the business value of the company. These findings correspond to the findings explained at the beginning of the work. Baroudi & Lucas (1994), argue that successful implementation of IT governance brings various benefits and opportunities, including improved

communication and collaboration between IT and other business functions. Last but not least, all companies have established clear IT policies, standards, and procedures, which makes this alignment easier, and results in improved operational efficiency, IT-supported business growth and expansion, and IT-driven innovation.

It is important to mention that just like when it comes to the digital culture, there is no information about the digital transformation strategy or IT governance for the company Vici Ventus, which can be seen in subchapters 3.4 and 3.6. Therefore, we were not able to draw any similarities between it and the other three companies. Moreover, we are just able to say that there is a significant difference in the emphasis on digital culture and IT governance between Vici Ventus and the rest of the companies because they put a lot of work into creating an appropriate culture and emphasize the importance of IT governance, while Vici Ventus not only is not emphasizing the importance of any of the two concepts but is also not working on developing one since there is no need for it.

Lastly, when it comes to key success factors, we can see that due to specific types of businesses, companies have different factors showing success that are specific to each sector. What is more, Vici Ventus does not have any defined key success factors of digitalization due to the lack of digitalization initiatives and objectives. Nevertheless, we can underline some main factors that are present in the other three companies and show a high level of success. Firstly, those are customers, employees, and social responsibility. As seen in subchapters 4.8., 5.8., and 6.8., these factors are popular and accepted among all three companies due to the similarities they have in the company's culture. As mentioned, their cultures promote customer-centricity, employee satisfaction, and sustainability. Having satisfied customers, motivated and happy employees, and maintaining the highest standards in environmental protection emphasize businesses' success.

Additionally, the company's digital transformation has led to the emergence of key success factors that are now recognized as significant advantages. Understanding the strength and importance of these factors is vital, as all the analyzed companies attribute their success to them. One such factor mentioned in subchapters 5.8. and 6.8. is a robust technical infrastructure that empowers companies to deliver high-quality products and services, effectively meeting customers' needs and driving revenue generation. Data integration and analysis form another crucial success factor, enabling companies to extract valuable insights that add value to consumers and facilitate data-driven decision-making. This, in turn, enhances transparency, coordination, quality control, traceability, and responsiveness within the organization, ultimately boosting agility and efficiency. The ultimate goal of all companies is to enhance the customer experience, making these factors invaluable.

Alongside integration and data analysis, automation and optimization also emerge as key success factors among the four companies which are emphasized in subchapters 4.8., 5.8.,

and 6.8. Leveraging automation and optimization empowers companies to enhance operational efficiency, improve productivity, and reduce costs, leading to a competitive edge in the market. Our interviewees highlighted the importance of collaboration and connectivity as essential success factors. Establishing strong connections both within and outside the company is critical, ensuring seamless collaboration among employees, shareholders, suppliers, and logistics teams. A culture of knowledge-sharing and teamwork, alongside an integrated supply chain, drives success. Moreover, fostering collaborations and partnerships with other companies, international businesses, and individuals expands knowledge resources and market share, providing an additional edge to the company's endeavors.

Mitigating risks related to data privacy and security emerges as a fundamental success factor since customers are sensitive about data sharing. Ensuring a digitally diverse and skilled workforce is another key aspect of coping with ever-changing market trends and demands. Our interviewees emphasized the significance of a supportive learning environment, offering attention and guidance to employees while fostering a culture of continuous skill and competency development, equality, and inclusivity. This ensures the organization remains adaptable to digital evolution. Additionally, a digitally skilled workforce enables companies to stay relevant in the industry by keeping pace with new trends and technologies, further underlining its importance in our interviews.

Cultivating these factors and results within the company relies heavily on strong and appropriate leadership as a key success factor. Effective leadership plays a crucial role in driving digital transformation and ensuring the seamless integration of these success factors. By embracing and fostering these elements, companies can not only succeed in their digital endeavors but also remain at the forefront of innovation and market relevance.

## **7.2 Comparison of opportunities between different sectors**

When it comes to the opportunities and challenges that arise from implementing digitalization and using new technologies, we can say that there are many of them that are common in all four sectors we described, and only a few of them that are specific to one sector only. Among the most prevalent opportunities shared across all four sectors are the following shown in Table 2, along with their short explanation.

By becoming more digitalized, companies start using new technologies that make their work easier, more efficient, cheaper, faster, and better. In that way, workers spend less time and resources on certain activities and have more time and resources to spend on other activities that are more important and bring higher value to the final product or service. Not only are they able to focus on more important activities, but companies also have more time and resources to focus on creating new products, services, business models, and revenue streams. Additionally, businesses are able to make more effective

and efficient decisions because of data-driven decision-making, which contributes to improved production processes. All these things contribute to the company’s innovation culture and market expansion, and eventually, more income is generated.

*Table 3: Opportunities common to all four industry sectors*

<b><i>Opportunity</i></b>	<b><i>Description</i></b>
Enhanced efficiency and productivity	Implementation of digitalization and new technologies leads to improved efficiency and productivity within companies.
Improved sustainability	By embracing digitalization, businesses have the potential to enhance their sustainability efforts and minimize negative environmental impacts and waste.
Opportunities for new business models	Digitalization opens doors to innovative business models and fosters the creation of new revenue streams.
Innovation	The adoption of new technologies fosters a culture of innovation within organizations, facilitating market expansion and growth.
Leveraging emerging technologies	Companies can capitalize on emerging technologies to gain a competitive edge and drive business success.
Development of new products	Digitalization enables businesses to explore new product development opportunities, leading to expanded offerings and increased market relevance.
New revenue streams	The integration of digital technologies opens avenues for generating additional sources of income and diversifying revenue streams.
More income generated	By harnessing digitalization, companies can tap into new markets and leverage their enhanced capabilities to generate increased income.
Remote work	Digitalization facilitates remote work opportunities, providing flexibility for employees and reducing the limitations of physical location.
Less time and resources spent	By streamlining processes through digitalization, companies can optimize resource utilization and allocate more time and resources to high-value activities.
Outsourcing of “unimportant” work	Digital technologies allow companies to outsource less critical tasks, freeing up internal resources for strategic initiatives.
Data-driven decision making	Data analytics and digital tools enable companies to make informed decisions based on valuable insights, enhancing overall decision-making processes.
Improved production processes	The integration of digital technologies improves production processes, leading to increased efficiency and quality of output.
Enhancing employee and customer experience	Digitalization efforts focus on improving the experiences of both employees and customers, leading to higher satisfaction levels.

*Source: Own work.*

Moreover, as mentioned in subchapters 3.1., 4.1., 5.1., and 6.1., digitalization and new technologies allow companies to easily outsource less important activities that they do not want to spend time on, which also creates more space for important activities and decisions. Furthermore, the use of new technologies puts a strong focus on customer and employee satisfaction, which means that by becoming more digitalized, companies enhance both employee and customer experiences. Things like data analytics enable companies to realize what people truly want and need and provide a method on how to deliver it and achieve a high level of success. Moreover, they lower the level of risk because instead of guessing what is needed, the companies already have valuable insights. Last but not least, emerging technologies allow companies to focus and promote sustainability and minimize negative environmental impact and waste. All these opportunities present not only a great chance for every company to perform better, but also highlight what should be the goals in general for every business, like having high customer satisfaction, low costs, high level of efficiency, etc.

On the other hand, there are some opportunities that are specific to one sector only. For example, as seen in subchapter 3.1., an important opportunity for the primary sector are improving food security and facilitating access to the global supply chain. Although these opportunities are specific for one sector only, they are of higher importance and could potentially make a highly positive impact on the whole world and humanity, instead of making changes only in the primary sector. Improving food quality and security greatly impacts people all around the world, and if we consider that, it technically means that those opportunities actually impact other sectors as well. For instance, the secondary sector, with a focus on food production will have to change some ways food is produced, which will change some of their activities and the ways employees work. As we know, every change brings its own advantages and disadvantages, so in this case, the advantage would be a higher quality outcome, while the disadvantage could be significant investments in machinery or processes. When it comes to the tertiary sector that focuses on providing services, it means that they will be able to provide higher quality and security of the food they offer as part of their services. This could potentially increase their customer base and satisfaction, but on the other hand could also increase costs. Although the quaternary sector is not highly impacted by food in any way, we can say that workers from this sector could potentially be healthier due to the global increase in quality and security, which could potentially lead to happier, longer, and better outcomes of each worker, institution, and company.

However, some types of opportunities are truly specific to one sector only. For instance, by implementing digitalization in the educational sector, as described in subchapter 6.1., there is an opportunity to provide online tutoring and help to students from all around the world, no matter their country, subject, school, or university. Despite the fact that this type of opportunity is great and highly used among students from different fields of study, it does not affect anyone else outside this sector.

### **7.3 Comparison of challenges between different sectors**

Unlike opportunities, there are numerous challenges that are prevalent across all four sectors we have chosen to analyze. Table 3 allows us to explore these challenges in detail.

Given the fact that technology is rapidly changing, not only do businesses have to adapt, but employees as well to remain competitive. However, as mentioned in subchapters 3.1., 4.1., 5.1., and 6.1., the workforce lacks the necessary expertise to utilize new technologies, so the skills gap is an obstacle that affects almost every industry. Even if companies find an adequate worker, they constantly have to provide training and education sessions to upskill and get new skills that are required and changed on a daily basis.

In addition to being difficult to constantly keep track of changes related to new knowledge and skills, it is also difficult to afford it which are described in subchapters 3.1., 4.1., 5.1., and 6.1. Things related to education like upskilling, seminars, workshops, and similar, cost a lot of money, and not everyone can afford it. Moreover, gaining greater knowledge requires higher salaries, at least at some point. Additionally, due to the high costs of educating staff, significant investments in technologies are required as well, so the knowledge can be used. It might be hard for businesses to provide all these things, so some of them might get lost in the complexity and result in failure.

The sensitivity of intellectual property is another important challenge arising from the advancement of digitalization as described in subchapters 3.1., 4.1., 5.1., and 6.1. The usage of data is of high importance to businesses because it allows them to have highly satisfied customers. However, people are concerned about data privacy and security, so companies need to put a strong focus on how to secure data and assure its privacy while using it to enhance customer experience. One small mistake can significantly harm businesses and make them lose a significant number of customers.

On the other hand, there are some challenges specific to a certain sector; like the lack of face-to-face interactions in the educational sector as mentioned in subchapter 6.1. Although remote work creates opportunities in almost every sector, including the educational sector, it might also negatively affect the educational sector. While managers and businesspeople will probably be happy to discuss business opportunities via video conference, students in schools and universities might be damaged by it. Young people are developing and are required to have in-person communication to develop certain skills that will help them in the future, both in business and the private world. Moreover, by meeting people in person, students create and develop a network of people, which is of high importance. Some of those people will be your forever friends while others will be your business partners who enabled your business success. So, although digitalization allows us to enroll in a course held in another country, we need to keep in mind that the growth and evolution of young people require much more than that.



Table 4: Challenges common to all four industry sectors

<b>Challenge</b>	<b>Description</b>
<i>Limited availability of digital infrastructure and technology access</i>	<i>Many regions, especially in developing countries, face the hurdle of limited access to digital infrastructure and technologies. This lack of access poses a challenge for these regions to fully embrace digitalization and leverage its benefits.</i>
<i>Necessity for education and training</i>	<i>One of the key challenges lies in the need for education and training to equip workers with the required skills to utilize new technologies effectively. Finding workers who possess these skills can be a daunting task, as the skills needed for digitalization are continuously evolving. Constant training and upskilling become imperative for organizations to keep up with the pace of technological advancements.</i>
<i>Significant investments</i>	<i>The integration of digitalization requires substantial investments in infrastructure, technologies, and training programs. These financial obligations can be a burden for businesses, especially when immediate profits from new technologies are not guaranteed. The costs associated with these investments can result in complexity and financial strain for organizations.</i>
<i>Complexity</i>	<i>The adoption of new technologies can introduce complexities into business operations. Organizations must navigate through various technical challenges and ensure seamless integration of new systems and processes. Failure to manage this complexity can lead to inefficiencies and potential business failures.</i>
<i>Data security, reliability, and privacy</i>	<i>With increased reliance on digital technologies, ensuring data security, reliability, and privacy becomes paramount. Businesses must prioritize robust data protection measures to build customer trust and prevent data breaches that could result in significant financial and reputational damages.</i>
<i>Skills gap</i>	<i>The skills gap is a challenge faced by every sector. Workers often lack the necessary skills to effectively utilize new technologies. Finding qualified individuals who possess the required skills to navigate the digital landscape can be challenging. Organizations must invest in training and upskilling programs to bridge this gap.</i>
<i>Talent acquisition and retention</i>	<i>Attracting and retaining talented individuals who are well-versed in digital technologies can be a challenge. The competition for skilled professionals in the market is fierce, and organizations must offer attractive incentives and growth opportunities to secure and retain top talent.</i>
<i>Constant upskilling and reskilling</i>	<i>The dynamic nature of technology demands continuous upskilling and reskilling of the workforce. Employees need to adapt to evolving technologies and stay updated with the latest industry trends. Organizations must provide ongoing training and development opportunities to ensure their workforce remains competitive and capable of driving digital transformation.</i>
<i>Integration of legal systems</i>	<i>The integration of digital technologies across sectors requires the harmonization and adaptation of legal systems to address new challenges and ensure compliance. Overcoming legal barriers and aligning regulations with digital advancements can be complex and time-consuming.</i>
<i>Limited unreliable internet connectivity</i>	<i>In certain regions, both in developed and developing countries, limited or unreliable internet connectivity poses a significant challenge. Businesses operating in remote or geographically dispersed locations may face difficulties in accessing stable and high-speed internet connections, hindering their digitalization efforts.</i>

Source: Own work.

Furthermore, some challenges refer to the primary sector specifically because it is more present in developing countries than other companies are. For example, the less developed countries find it difficult to follow up since they have less access to new technologies and digitalization than the rest of the world, which is described in subchapter 3.1. Due to limited access, those types of countries and cities are not able to completely adapt to new technologies and utilize features that digitalization creates. Furthermore, limited or poor internet connectivity, which is also mentioned in subchapter 3.1., presents another challenge not only for developing countries but also for businesses in developing countries that operate in remote or geographically dispersed locations.

It is important to address these challenges collectively and proactively to ensure that the benefits of digitalization are accessible to all, while also mitigating the potential drawbacks and adapting to the evolving landscape.

#### **7.4 Differences amongst companies interviewed**

As we have examined the digital culture and its commonalities, we shall also examine the differences in it through our companies. We can say that the company from the primary sector differs from all three other companies as it does not have any digital culture, other than the digital proficiency of its owners developed on their own, personal time. Additionally, our interviewee from Hilton Garden Inn has claimed that they have never had any resistance from its employees, only cautiousness; whereas, on the other hand we have noted that an interviewee from RIT Croatia admitted to some resistance from the employees during the beginning phase of digitalization. There could be a number of reasons for this difference amongst the companies.

Furthermore, in Hilton Garden Inn we have discovered a culture of risk-taking, innovation and continuous learning, whereas in HIŠ we can find a culture of forward-thinking, and exploring, just not explicitly acting on the discoveries until discussed with the superiors.

Another difference between the company from the tertiary sector (Hilton Garden Inn) and the company from the secondary sector (HIŠ) is that decisions regarding IT initiatives at HIŠ are upon management, while in Hilton Garden Inn the IT department bears that responsibility.

Unlike other three companies, Hilton Garden Inn outsources some of the business processes that require a certain level of digitalization; for instance, as discussed in subchapter 5.4, we determined that they use external applications supported by external providers to manage reservations. When we asked other companies about their outsourcing strategies, we did not come up with anything. Additionally, Hilton Garden Inn is the only company discussed which uses gamification in their business through a loyalty app on which one can collect points by making purchases and therefore, rewards.

In terms of IT governance, we can see a difference between RIT Croatia and HIŠ. RIT Croatia's IT investment decisions are brought by our interviewee, who is the Director of Strategic Development ITS and Facilities, and the Dean; while on the other hand, HIŠ has formed an IT governance committee (discussed in subchapter 4.6) responsible for overseeing these investments.

What can be noticed from the companies examined is that RIT Croatia and Hilton Garden Inn tend to include their end users in digitalization, while HIŠ and Vici Ventus do not have these tendencies. Of course, Vici Ventus does not have these tendencies as it does not have a process of digitalization even started, however HIŠ does and it does not include the end users. RIT Croatia includes its users through the nurture of their digital capabilities, and offering them specialized workshops in data analytics, cybersecurity, and so on as discussed in subchapter 6.4. As mentioned in 5.4. Hilton offers an app called Hilton Honors, for their customers to use, and therefore explore some of the digitalization processes set in place.

### **7.5 Theoretical and practical implications of findings**

In this section, we discuss the theoretical implications arising from our comparative study of digitalization in different industry sectors. Our aim is to contribute to the existing theoretical understanding of digitalization processes and strategies by analyzing the findings from our study of four companies. We critically reflect on the implications of our research for relevant findings, and concepts and explore their broader applicability in diverse industry contexts.

Our findings support and build upon several existing findings and concepts related to digitalization. For example, McKinsey's study revealed that digitalization can boost productivity by up to 15% (Manyika et al., 2016); and Parviainen, Tihinen, Kääriäinen, & Teppola (2017) discovered that digitalization speeds up workflows, lower the time and expenses in producing goods and services, which leads to increased efficiency and productivity. Our findings are similar to previous findings in a sense that they claim how digitalization enhances productivity and efficiency as an opportunity common to all four industry sectors.

Through our comparative analysis, we noticed consistent patterns and practices across the four companies, which reinforce the relevance of established theoretical frameworks. For example, the concept of organizational culture emerged as a significant factor influencing digitalization efforts, aligning with existing literature on the role of culture in shaping digital transformation outcomes. As previously stated in the work, Cameron & Quinn (2011) have found out that a strong organizational culture aligns employee behavior with the mission, vision and values of the organization, while at the same time promoting a sense of shared purpose teamwork, and collaboration among employees. Moreover, Judge & Robbins (2017) have claimed that organizational culture can, however, have both

positive and negative effects. A toxic or dysfunctional culture can result in low employee satisfaction, high turnover rates, and hinder organizational effectiveness, while a healthy culture can boost staff morale and organizational performance (Robbins & Judge, 2017). By providing empirical evidence of shared cultural characteristics across diverse industry sectors, our study contributes to validating and enhancing this theoretical perspective.

In addition to validating existing findings, our study also identifies new avenues for research in the field of digitalization. The comparative analysis revealed unique challenges and opportunities specific to each industry sector, highlighting the need for sector-specific theoretical frameworks. This opens up possibilities for future research to explore the industry-specific factors that influence the success of digitalization, such as regulatory factors, market dynamics, and customer behavior. By pinpointing these research gaps, our study lays the foundation for further investigations that delve deeper into the complexities of digitalization across diverse industry contexts.

Beyond theoretical contributions, our findings have practical implications for practitioners, policymakers, and other stakeholders. The insights gained from our comparative analysis provide valuable guidance for organizations operating in different industry sectors, informing their digital transformation strategies and decision-making processes. By understanding the common practices, beliefs, and values observed across the four companies, practitioners can leverage these insights to enhance their own digitalization initiatives. Policymakers can also benefit from our study by identifying sector-specific policy interventions that facilitate and promote digital transformation in different industries.

By validating existing findings, identifying new research directions, and highlighting practical implications, our study contributes to the body of knowledge on digitalization and its industry-specific manifestations.

## **7.6 Limitations and further research**

During the course of our research, we encountered several notable limitations that posed challenges and hindered our ability to provide a more comprehensive and detailed analysis. Foremost among these limitations was the restricted access to the necessary data, particularly concerning the practical aspects of our thesis. While we managed to obtain ample information for the theoretical framework, our access to relevant data regarding the selected companies was severely limited. Consequently, we heavily relied on conducting interviews and gathering data independently. However, this approach also presented its own set of limitations.

Some companies were unwilling to participate in interviews or provide answers to our inquiries, citing sensitivity and confidentiality concerns regarding the requested information. This presented a significant constraint on our research, as it impeded our ability to collect primary data while also limiting the availability of secondary data.

Moreover, the companies required considerable time to respond to our inquiries, resulting in delays of several weeks or even months to gather a fraction of the required data. This extended timeline for data collection made it more challenging for us to keep pace with new and existing information. Additionally, our focus primarily centered on the initial stages of digitalization implementation within the companies. Consequently, we lacked insights into the long-term impacts of new technologies and digital transformation, limiting our ability to provide strongly validated recommendations for future use. However, this limitation suggests the potential for future research, where the long-term outcomes can be analyzed, and further recommendations can be formulated.

In terms of expanding the research, we believe that a larger sample size would be beneficial. By including a more diverse range of companies, the research findings could yield more generalized conclusions that hold greater significance for future endeavors. For example, researchers may be able to draw more conclusive insights regarding opportunities and threats within specific industry sectors or gain a better understanding of why and how companies should approach digital transformation. However, the reluctance of companies to share detailed information about their strategies, structures, objectives, values, governance, and other relevant aspects would pose a considerable challenge in obtaining more substantial and detailed findings and actionable solutions.

In summary, the limitations we encountered in terms of data availability, interview participation, time constraints, and the focus on initial digitalization stages necessitate further research to explore long-term impacts and expand the sample size. Despite these limitations, our study provides valuable insights into the initial stages of digitalization implementation and offers a foundation for future investigations

## **CONCLUSION**

The primary objective of our research was to acquire a comprehensive understanding of the profound impact digitalization has on diverse industries and the companies operating within them. Our overarching goal was to make a substantive contribution to the existing body of knowledge by unveiling compelling findings regarding the transformative journeys undertaken by businesses in the digital realm. We successfully achieved our purpose by rigorously defining and explicating key digitalization concepts while unveiling the accompanying trends that shape this dynamic landscape. Moreover, we meticulously delineated and interpreted the four industry sectors we specifically selected for analysis, affording us the opportunity to consolidate and augment our knowledge base surrounding digitalization and emerging technologies. Through these meticulous analyses, we managed to forge a lucid, robust, and well-defined understanding of the true essence of digitalization and its unparalleled importance in the contemporary world.

Furthermore, we effectively fulfilled our goal by effectively leveraging our extensive knowledge and theoretical acumen throughout the data collection process, which centered on examining the digital transformation journeys of numerous companies. This multifaceted approach allowed us to generate an array of novel insights and results, offering invaluable perspectives on the challenges and opportunities confronting each industry sector. In addition to shedding light on these critical aspects, we astutely expounded upon the transformational strategies employed to harness these opportunities and surmount the inherent obstacles. Moreover, our research successfully addressed the core research questions, providing salient data pertaining to transformation strategies, sector-specific challenges and opportunities, as well as effective ways to harness the potential of digital technologies.

Conducting a comprehensive analysis encompassing companies from diverse sectors, we arrived at the firm conclusion that a triumphant digital transformation necessitates not only the seamless integration of novel technologies but also the careful orchestration of a comprehensive and well-aligned strategy, purposefully designed to propel the organization toward its objectives and goals. Moreover, our investigation revealed that this strategy must be fortified by robust cross-functional collaboration, an innovative mindset, a commitment to excellence, open communication channels, knowledge-sharing mechanisms, and an unwavering dedication to continuous learning. These essential components enable organizations to deftly navigate the ever-evolving market landscape, adapting swiftly to emergent changes. Furthermore, we skillfully unearthed the shared and distinctive characteristics exhibited among companies, resulting in a plethora of significant findings related to digital transformation. Additionally, we effectively identified and delineated the key challenges that universally resonate across organizations engaged in digitalization, such as cybersecurity, data privacy, and the safeguarding of intellectual property.

In summary, our findings underscore that a triumphant digital transformation hinges not merely on the adroit implementation of new technologies but rather on the meticulous development and execution of a comprehensive and intricately crafted strategy. Our research reveals that businesses must equally attend to critical elements such as their organizational culture, governance structures, value creation mechanisms, and risk mitigation practices alongside their technology adoption efforts. Moreover, our findings emphasize the imperative for organizations to foster adaptability and embrace perpetual transformation as technology advances and industries undergo disruptive shifts. By wholeheartedly embracing digital transformation and resolutely addressing the attendant challenges, businesses position themselves for sustainable growth, enhanced operational efficiency, and the delivery of unparalleled customer experiences in the digital era. Through these findings, our research substantively contributes to the existing knowledge base while providing guidance on the areas of focus that businesses should prioritize.

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## **APPENDICES**



## **Appendix 1: Summary in the Slovene language**

Digitalizacija močno vpliva na vse vidike današnjega sveta, še posebej ko gre za poslovni svet. Ustvarja številne nove priložnosti tako za podjetja kot za stranke, hkrati pa omogoča nižje stroške, učinkovite rezultate in večji tržni delež (Kane, Palmer, Phillips, Kiron & Buckley, 2015). Po drugi strani pa digitalizacija prinaša veliko nevarnosti, ki jih je treba upoštevati pred uvedbo novih tehnologij. Vsako podjetje bi se moralo močno osredotočiti na analizo vsega tega, da bi lahko učinkovito uporabljalo nove tehnologije za ustvarjanje poslovne vrednosti, saj je uvedba novih tehnologij eden izmed pomembnih načinov, da ostane konkurenčen na trgu (Manyika et al., 2016).

Vendar pa imajo različni industrijski sektorji posamezne značilnosti, ki močno vplivajo na način digitalizacije v določenih sektorjih in ustvarjajo različne vrste priložnosti in nevarnosti za vsako podjetje. Na primer, zdravstveni sektor bi moral digitalizacijo uporabljati drugače kot maloprodajni ali finančni sektor. Zato mora vsak sektor ne samo opredeliti načine uporabe novih tehnologij, temveč mora imeti vsako podjetje opredeljeno strategijo in načrt uvajanja.

V magistrskem delu sva uporabili pristop primerjalne študije primera za raziskovanje načinov vpliva digitalizacije na poslovni svet. Proučili sva načine uporabe novih tehnologij, kakšne priložnosti ustvarja digitalizacija v štirih različnih industrijskih sektorjih in podjetjih znotraj njih ter kako so jo ta podjetja uporabila za izboljšanje svojega poslovanja. Poleg tega sva analizirali načine digitalizacije v štirih hrvaških podjetjih: Vici Ventus d.o.o., Hrvatska Industrija Šećera d.d., Hilton d.o.o. in RIT Croatia iz različnih industrijskih sektorjev: primarnega, sekundarnega, terciarnega in kvartarnega. Analizirali sva osnovne poslovne procese posameznega podjetja, digitalno kulturo podjetja, strategijo digitalne transformacije, ustvarjanje poslovne vrednosti, upravljanje IT v podjetju, zmanjševanje tveganj podjetja in ključne dejavnike uspeha. Zajeta je tudi analiza priložnosti in nevarnosti, ki jih ustvarja digitalizacija znotraj vsakega sektorja.

Poleg opisa digitalizacije omenjenih podjetij so cilji magistrskega dela še:

- identifikacija strategije digitalne preobrazbe, ki jih je sprejelo vsako od štirih podjetij,
- analiza vpliva digitalizacije na poslovne procese, poslovanje in uspešnost štirih podjetij,
- identifikacija dejavnikov, ki prispevajo k uspehu ali neuspehu podjetja in opredelitev ključnih dejavnikov uspeha,
- opredelitev digitalne kulture vsakega podjetja,
- analiza zmanjšanja tveganja,
- ocena uspešnosti pobud podjetij za digitalno preobrazbo,

- prepoznanje izzivov in priložnosti, ki jih digitalne tehnologije predstavljajo v vsakem sektorju, in kako se jim podjetja prilagajajo,
- ugotovitev najboljših praks in pridobljenih izkušenj, ki jih je mogoče uporabiti pri drugih podjetjih, ki se soočajo s podobnimi izzivi,
- analiza, kako je digitalna preobrazba prinesla poslovno vrednost vsakemu podjetju in
- primerjava prizadevanj štirih podjetij za digitalizacijo ter ugotovitev podobnosti in razlik.

Namen magistrskega dela je tako dopolniti obstoječe znanje o digitalizaciji v različnih panogah in zagotoviti ustrezne vpoglede podjetjem, ki načrtujejo lastne digitalne preobrazbe. Razen tega sva želeli z ocenjevanjem izkušenj in poti izbranih podjetij odkriti najboljše prakse, ovire in dejavnike uspeha, ki bi lahko služili kot priporočila za prihodnja prizadevanja za digitalno preobrazbo v primerljivih podjetjih in panogah. Doprinos dela je v prepoznavanju težav in priložnosti, ki jih prinaša digitalizacija v različnih industrijskih sektorjih, kot tudi v ocenjevanju taktik in pristopov, ki se lahko uporabljajo za pomoč organizacijam pri preživetju in uspehu v digitalni dobi. Rezultati so uporabni za podjetja, ki poskušajo izboljšati svojo digitalizacijo.

Magistrsko delo se osredotoča na odgovore na naslednja raziskovalna vprašanja:

1. Katere strategije digitalizacije so sprejela podjetja iz različnih industrijskih sektorjev?
2. Kakšne so prednosti in izzivi štirih industrijskih sektorjev, ki izhajajo iz implementacije digitalizacije?
3. Kateri so najboljši načini uporabe digitalnih tehnologij v različnih sektorjih za doseganje uspeha?

Pri izdelavi magistrskega dela sva uporabili primarne in sekundarne podatke ter metode zbiranja. Za zbiranje primarnih podatkov sva opravili intervjuje s predstavniki treh različnih podjetij. Po drugi strani pa sva za zbiranje sekundarnih podatkov uporabili že obstoječe podatke iz znanstvenih in strokovnih člankov, knjig, anket, opazovanj itd.

Po analizi štirih podjetij in njihovih strategij digitalne preobrazbe sva naredili primerjavo obravnavanih podjetij in potegnili nekaj zaključkov o omembe vrednih lastnostih, ki jih dosledno izvajajo in si delijo vsa. Prvič, ugotovili sva, da ko gre za digitalno kulturo podjetij, obstajajo lastnosti, ki so skupne vsem analiziranim podjetjem, kot so osredotočenost na stranke, agilnost, prilagodljivost, ustvarjalnost, reševanje problemov, odprta komunikacija, deljenje znanja, vključenost, navdušenje itd. Drugič, ugotovili sva, da se je vsako podjetje odločilo za digitalno preobrazbo, da bi ostalo konkurenčno, okrepilo svoj položaj na trgu in zagotovilo vrednost svojim strankam. Poleg tega je končni cilj strategije vsakega podjetja uskladiti nove tehnologije s poslovnimi rezultati. Tretjič,



ko gre za upravljanje informacijske tehnologije v podjetjih, sva ugotovili, da je končni cilj upravljanja vsakega podjetja uskladiti nove tehnologije s poslovnimi cilji, da bi ustvarili dragocene rezultate za svoje stranke. Vsako podjetje ima vzpostavljene IT politike, standarde in postopke, ki olajšajo uskladitev in izboljšajo rezultate. Pomemben dejavnik je tudi zmanjševanje tveganj, povezanih z digitalizacijo in uvajanjem novih tehnologij. Glavno tveganje, s katerim se podjetja soočajo, so pomisleki glede zasebnosti in varnosti, ki jih je treba zagotoviti, da se kupci odločijo za uporabo izdelkov in storitev podjetja. Vendar pa bo zaradi velike količine uporabljenih podatkov podjetjem morda težko ohraniti zasebnost in varnost vsakega posameznega podatka. Končno, ko gre za ključne dejavnike uspeha, lahko opazimo, da imajo različne vrste organizacij različne značilnosti uspeha, ki so specifične za vsak sektor. Kljub temu lahko izpostavimo nekatere ključne vidike, ki so prisotni v vsaki organizaciji in izkazujejo visoko raven uspešnosti. To so kupci, zaposleni in družbena odgovornost.

Poleg tega sva se med raziskavo soočali z omejitvami, kot je nepripravljenost podjetij, da sodelujejo in dajo odgovore na naša vprašanja na intervjuju. Poleg tega nama je manjkal vpogled v dolgoročne vplive novih tehnologij in digitalne preobrazbe, saj sva se osredotočali predvsem na začetne faze uvajanja digitalizacije v podjetjih. Poleg tega sva se soočali z omejitvami glede razpoložljivosti podatkov in časovnimi omejitvami.

Za zaključek najine ugotovitve kažejo, da uspešna digitalna transformacija ni odvisna samo od spretne uporabe nove tehnologije, ampak tudi od temeljite zasnove in izvedbe celovite in prefinjene načrtovane strategije. Najina raziskava kaže, da je treba bistvene komponente, kot so organizacijska kultura, strukture upravljanja, metode ustvarjanja vrednosti in tehnike za zmanjševanje tveganja, obravnavati skupaj s prizadevanji za uvajanje tehnologije. Poleg tega najine ugotovitve poudarjajo, kako pomembno je, da podjetja spodbujajo prilagodljivost in sprejemajo nenehne spremembe, ko tehnologija napreduje, čeprav so spremembe včasih moteče za zaposlene. Podjetja, ki v celoti sprejemajo digitalno preobrazbo in agresivno rešujejo s tem povezane težave, so pripravljena na dolgoročno rast, izboljšano operativno učinkovitost in zagotavljanje odlične uporabniške izkušnje v digitalni dobi. Najine ugotovitve pomembno prispevajo k obstoječemu znanju, hkrati pa nudijo nasvete za druga podjetja o tem, da katera področja naj se osredotočijo.

## **Appendix 2: Interview questions**

### **Secondary sector - Hrvatska Industrija Šećera**

1. *To successfully compete with other food production companies, Hrvatska Industrija Šećera had to start its own process of digitalization. Could you please explain, from your point of view, how and why was this process needed and started? Do you by any chance know what set this process in motion?*
2. *To cope with digitalization and trends in the market, did you have to change your business model and why? How does it look now? What is your value proposition, value chain, and revenue model?*
3. *Have you noticed any digitalization challenges that are specific for your industry sector (no other sector faces these challenges, or at least not to the same extent), and if yes could you please elaborate on what these challenges are and what you are doing to overcome them?*
4. *Have you, on the other hand, noticed any opportunities that are specific for your industry sector regarding digitalization (these opportunities are presented only to your industry sector, or mostly to your industry sector)? If yes, could you please elaborate more on what they are and how you exploit them.*
5. *During the process of digitalization and currently perhaps, do you remember employees or the users being hesitant to use new technologies and similar? Was any resistance felt?*
6. *To achieve a successful digital transformation, you need to have a defined vision, mission, strategy, and implementation. Could you describe yours?*
7. *Can you discuss any changes to the company's culture and mindset that have been necessary to achieve digital transformation?*
8. *What were/are your strategic goals?*
9. *Who leads (or maybe even started) the process of digitalization? Is it someone from top management or a person from the IT department?*
10. *Do you find it valuable if the top management speaks and openly supports digitalization?*
11. *Would you say that digitalization has brought your business value?*
12. *Could you explain in which sense the business value was created? In which way is this business value manifested? (maybe through improved decision-making,*

*customer satisfaction, employee satisfaction, increased profit, revenue growth, etc.?)*

- 13. Do you use any specific standards, frameworks, or processes when implementing IT? If yes, which ones and why?*
- 14. Could you elaborate on how you govern IT within your organization (IT governance in HIŠ)?*
- 15. Would you say that IT governance enables business/IT alignment? If yes, in what way?*
- 16. Who makes the decisions regarding the IT within your institution, and who makes the decisions about your IT investments?*
- 17. How is IT used in your company, meaning what are your IT principles?*
- 18. Could you elaborate more on your IT architecture and IT infrastructure?*
- 19. How do you know which IT investments you should make and which to prioritize?*
- 20. What is your core business and what are your business processes?*
- 21. What information drives the core processes?*
- 22. How would you say IT supports that core business and the business processes? Please elaborate.*
- 23. How would you describe your collaboration between the IT department and the rest of the departments? Are the rest of the departments included in any IT decisions?*
- 24. Do you outsource any IT-intensive business processes? If yes, can you explain which ones and how?*
- 25. What cloud computing services do you use? Could you explain how you use them and for what purposes?*
- 26. What types of software do you use in your processes (if any)? Could you please elaborate on why they are used, and how they bring value and support your processes? (any SaaS, Paas, or similar)*
- 27. Do you secure your intellectual property and if yes, could you explain how? (domain names, licensing, NDAs, copyright, etc.)*

28. *What are the current information systems used by the company to manage its sugar production processes, and how effective are they?*
29. *How do you manage the quality of sugar using your information systems?*
30. *How does the company collect and analyze data related to its sugar production, and what tools or software are used for this purpose?*
31. *Has the company implemented any digitalization initiatives in recent years to improve its sugar production processes, and what were the outcomes of these initiatives?*
32. *To what extent does the company use automation and robotics in its sugar production processes, and how has this impacted efficiency and productivity?*
33. *How does the company use digital platforms and technologies to connect with customers and suppliers in the sugar industry, and what benefits have been realized from this approach?*
34. *What role do digital technologies play in the company's supply chain management, from sourcing raw materials to delivering finished sugar products to customers?*
35. *How has HIŠ adapted its processes and systems to become more agile?*
36. *Has HIŠ's agility improved its collaboration and communication across teams, and if yes, in which ways?*
37. *Do you use any analytics engines? If yes, could you explain their use and purpose?*
38. *How do you manage data quality?*
39. *Do you use any description languages like IDEF, BPMN, ARIS, etc.? If yes, why and for what?*
40. *What are your key performance indicators?*
41. *Do you find your organization transparent when it comes to sharing information among departments?*
42. *Do you have any information system risk management set in place? Can you explain it, if you do?*
43. *Whose focus is risk minimization? Which departments are in charge of identifying the threats and acting on them when needed?*

44. *One of the many challenges that come with the implementation of new technologies are consistent security management, data privacy, and data security. How do you achieve consistent security and data privacy, while ensuring data integrity of its digital systems and data related to sugar production?*
45. *How would you rate HIS's digitalization-would you say you are reaching digital maturity or are you in the beginning phases, or similar?*
46. *Has the company explored the use of blockchain technology to enhance transparency and traceability in its sugar production processes, and if so, what were the results?*
47. *How does the company ensure that its employees have the necessary digital skills and knowledge to effectively use the information systems and tools employed in sugar production?*
48. *What plans does the company have for future digitalization initiatives in its sugar production processes, and what are the expected benefits of these initiatives?*

#### **Tertiary sector - Hilton Garden Inn**

1. *To successfully compete with other hotels, Hilton Garden Inn had to start its own process of digitalization. Could you please explain, from your point of view, how and why was this process needed and started? Do you by any chance know what set this process in motion?*
2. *To cope with digitalization and trends in the market, did you have to change your business model and why? How does it look now? What is your value proposition, value chain, and revenue model?*
3. *During the process of digitalization and currently perhaps, do you remember employees or the users being hesitant to use new technologies and similar? Was any resistance felt?*
4. *To achieve a successful digital transformation, you needed to have a defined vision, mission, strategy, and implementation. Could you describe yours?*
5. *Can you discuss any changes to the company's culture and mindset that have been necessary to achieve digital transformation?*
6. *What were/are your strategic goals?*

7. *Who leads (or maybe even started) the process of digitalization? Is it someone from top management or a person from the IT department?*
8. *Do you find it valuable if the top management speaks and openly supports digitalization?*
9. *Would you say that digitalization has brought your business value and if yes, could you explain in which sense? In which way is this business value manifested? (maybe through improved decision-making, customer satisfaction, employee satisfaction, increased profit, revenue growth, etc.?)*
10. *Has Hilton Garden Inn implemented any digitalization initiatives in recent years to improve its operations, and what were the outcomes of these initiatives?*
11. *Do you use any specific standards, frameworks, or processes when implementing IT? If yes, which ones and why?*
12. *Could you elaborate on how you govern IT within your organization (IT governance in Hilton Garden Inn)?*
13. *Would you say that IT governance enables business/IT alignment? If yes, in what way?*
14. *Who makes the decisions regarding the IT within your institution, and who makes the decisions about your IT investments?*
15. *How is IT used in your company, meaning what are your IT principles?*
16. *Could you elaborate more on your IT architecture and IT infrastructure?*
17. *How do you know which IT investments you should make and which to prioritize?*
18. *What is your core business and what are your business processes?*
19. *What information drives the core processes?*
20. *How would you say IT supports that core business and the business processes? Please elaborate.*
21. *How would you describe your collaboration between the IT department and the rest of the departments? Are the rest of the departments included in any IT decisions?*
22. *Do you outsource any IT-intensive business processes? If yes, can you explain which ones and how?*

23. *What cloud computing services do you use? Could you explain how you use them and for what purposes?*
24. *What types of software do you use in your processes (if any)? Could you please elaborate on why they are used, and how they bring value and support your processes? (any SaaS, Paas, or similar)*
25. *Do you secure your intellectual property and if yes, could you explain how? (domain names, licensing, NDAs, copyright, etc.)*
26. *How do you manage your marketing and recruitment efforts using your information system?*
27. *How has Hilton Garden Inn adapted its processes and systems to become more agile?*
28. *Has Hilton's agility improved its collaboration and communication across teams, and if yes, in which ways?*
29. *What types of digital technologies or systems does Hilton Garden Inn currently use to manage guest reservations and check-in/check-out processes?*
30. *How does Hilton Garden Inn use data and analytics to personalize guest experiences and enhance customer satisfaction?*
31. *How do you manage data quality?*
32. *To what extent does Hilton Garden Inn use automation and robotics in its housekeeping and maintenance processes, and how has this impacted efficiency and productivity?*
33. *How does Hilton Garden Inn use digital platforms and technologies to connect with customers and promote its brand, and what benefits have been realized from this approach?*
34. *What role do digital technologies play in Hilton Garden Inn's supply chain management, particularly in relation to purchasing and inventory management?*
35. *Has Hilton Garden Inn explored the use of virtual and augmented reality technologies to enhance the guest experience, and if so, what were the results?*
36. *How does Hilton Garden Inn ensure that its employees have the necessary digital skills and knowledge to effectively use the information systems and tools employed in hotel operations?*

37. *Do you use any description languages like IDEF, BPMN, ARIS, etc.? If yes, why and for what?*
38. *What are your key performance indicators?*
39. *Do you find your organization transparent when it comes to sharing information among departments?*
40. *Do you have any information system risk management set in place? Can you explain it, if you do?*
41. *Whose focus is risk minimization? Which departments are in charge of identifying the threats and acting on them when needed?*
42. *How does Hilton Garden Inn ensure the security and privacy of guest data, particularly in light of increasing concerns about cyber threats and data breaches?*
43. *How would you rate Hilton's digitalization-would you say you are reaching digital maturity or are you in the beginning phases, or similar?*
44. *What plans does Hilton Garden Inn have for future digitalization initiatives in its operations, and what are the expected benefits of these initiatives?*

#### **Quaternary sector - RIT Croatia**

1. *To successfully compete among other educational institutions, RIT Croatia had to start its own process of digitalization. Could you please explain, from your point of view, how and why was this process needed and started? Do you by any chance know what set this process in motion?*
2. *To cope with digitalization and trends in the market, did you have to change your business model and why? How does it look now? What is your value proposition, value chain, and revenue model?*
3. *During the process of digitalization and currently perhaps, do you remember employees or the users being hesitant to use new technologies and similar? Was any resistance felt?*
4. *To achieve a successful digital transformation, you need to have a defined vision, mission, strategy, and implementation. Could you describe yours?*
5. *Can you discuss any changes to the institution's culture and mindset that have been necessary to achieve digital transformation?*
6. *What were/are your strategic goals?*



7. *Who leads (or maybe even started) the process of digitalization? Is it someone from top management or a person from the IT department?*
8. *Would you say that digitalization has brought you business value and if yes, could you explain in which sense? In which way is this business value manifested? (maybe through improved decision-making, customer satisfaction, employee satisfaction, increased profit, revenue growth, etc.?)*
9. *Do you use any specific standards, frameworks, or processes when implementing IT? If yes, which ones and why?*
10. *Could you elaborate on how you govern IT within your organization (IT governance at RIT)?*
11. *Would you say that IT governance enables business/IT alignment? If yes, in what way?*
12. *Who makes the decisions regarding the IT within your institution, and who makes the decisions about your IT investments?*
13. *How is IT used in your institution, meaning what are your IT principles?*
14. *Could you elaborate more on your IT architecture and IT infrastructure?*
15. *When it comes to business applications and similar, we know that you have Student Information System (SIS) and MyCourses for your students to use. Is this internally created or purchased? Could you elaborate on the purpose of it and how it supports your business processes?*
16. *How do you know which IT investments you should make and which to prioritize?*
17. *What is your core business and what are your business processes?*
18. *What information drives the core processes?*
19. *How would you say IT supports that core business and the business processes? Please elaborate.*
20. *How would you describe your collaboration between the IT department and the rest of the departments? Do you find your organization transparent when it comes to sharing information among departments? Are the rest of the departments included in any IT decisions?*
21. *Do you outsource any IT-intensive business processes? If yes, can you explain which ones and how?*

22. *What cloud computing services do you use? Could you explain how you use them and for what purposes?*
23. *What types of software do you use in your processes (if any)? Could you please elaborate on why they are used, and how they bring value and support your processes? (any SaaS, Paas, or similar)*
24. *Do you secure your intellectual property and if yes, could you explain how? (domain names, licensing, NDAs, copyright, etc.)*
25. *How do you manage student records and academic progress using your information systems?*
26. *How do you manage class schedules and registration using your information systems?*
27. *How do you manage student billing and financial aid using your information system?*
28. *How do you manage the integration of your information system with your student information system?*
29. *How do you manage your alumni relations using your information system?*
30. *How do you manage your marketing and recruitment efforts using your information system?*
31. *How do you ensure the security and confidentiality of student data using your information system?*
32. *How has RIT adapted its processes and systems to become more agile?*
33. *Has RIT's agility improved its collaboration and communication across teams, and if yes, in which ways?*
34. *Do you use any analytics engines? If yes, could you explain their use and purpose?*
35. *How do you manage data quality?*
36. *Do you use any description languages like IDEF, BPMN, ARIS, etc.? If yes, why and for what?*
37. *What are your key performance indicators?*

*38. Do you have any information system risk management set in place? Can you explain it, if you do?*

*39. Whose focus is risk minimization? Which departments are in charge of identifying the threats and acting on them when needed?*

*40. How would you rate RIT's digitalization-would you say you are reaching digital maturity or are you in the beginning phases, or similar?*