

The Impact of Digital Technologies on Companies' International Business Activities

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List of Abbreviations

AI	Artificial Intelligence
ERP	Enterprise Resource Planning
FDI	Foreign Direct Investment
FSA	Firm-specific Asset
GDPR	General Data Protection Regulation
GVC	Global Value Chain
HQ	Headquarters
INV	International New Venture
IoT	Internet of Things
IT	Information Technology
KBV	Knowledge-based View
MNC	Multinational Corporation
OLI	Ownership, Location, and Internalization Advantages
R&D	Research and Development
RBV	Resource-based View
TCT	Transaction Cost Theory
VRIN	Valuable, Rare, Inimitable, Non-substitutable

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1 Introduction

Digitalization has become the center of attention for not only businesses but also the research in recent years. As a consequence, more and more companies are digitalizing their business processes to benefit from the advantages that digitalization can offer, and more and more scholars are focusing on the potential impacts of this trend on companies' operations. In this regard, digitalization has also received attention in the international business literature (e.g., Banalieva & Dhanaraj, 2019; Brouthers et al., 2016; Chen & Kamal, 2016; Li et al., 2019; Strange & Zucchella, 2017). Correspondingly, this research project follows the growing interest in the literature and aims to enhance the understanding of the research field about the above-mentioned impact.

1.1 Problem and Background of the Research Project

In the contemporary business landscape, digital technologies have emerged as a cornerstone for the operations, growth, and competitiveness of companies. As companies increasingly integrate digital technologies such as big data, artificial intelligence (AI), internet of things (IoT), augmented and virtual reality, and blockchain into their operations, traditional business paradigms have to be redefined, making the adoption of these technologies not merely a choice, but a strategic imperative. For international companies, whose operations span diverse geographies, cultures, and business environments, this trend of adopting digital technologies presents unprecedented opportunities (Ghauri et al., 2021, p. 5).

The opportunities include a wide spectrum of applications such as the ability to facilitate cross-border coordination and collaboration. For businesses operating across global markets, effective communication and data sharing tools are critical to maintain coherence in regard to their international activities. Moreover, digital technologies have the potential to affect market entry strategies and customer engagements. As globalization intensifies and markets become more interconnected, digital solutions provide international companies with access to insights into local customer preferences, market trends, and cultural nuances across different regions. These insights enable companies to adapt their products and services to local needs.

In line with the above-mentioned relevance of digital technologies for international companies, the international business literature has paid ample attention in the last decade to explore how digitalization affects companies' international business. Specifically, the integration of digital technologies into business processes may change the geographies of global value chain (GVC) activities and production systems (Butollo, 2021, p. 259; Dachs et al., 2019, p. 1), enhance the

global coordination of operations (Autio et al., 2021, p. 3), and increase the speed of internationalization (Lee et al., 2019, p. 1). Moreover, advanced technologies can affect international companies' boundary decisions in foreign markets (Chen & Kamal, 2016, p. 563), alongside their capabilities to expand internationally through online presence (Cahen & Borini, 2020, p. 1). In addition, the extensive use of digital technologies has led to the emergence of a new sharing economy, where partnerships with competitors and suppliers are an important element of success in global markets (Parente et al., 2018, p. 52).

Despite the growing interest among scholars, most studies have mainly explored the impact of the internet on international business (Ahi et al., 2022, p. 2). Although the internet is an important digital technology capable of connecting locations and markets, other technologies can also have specific effects on companies' international business. In this regard, the number of studies focusing on such specific effects is increasing in recent years. For instance, Hannibal and Knight (2018) and Laplume et al. (2016) examined the impact of 3D printing on the location of production systems around the world. Hooper and Holtbrügge (2020) studied the role of blockchain as a powerful global governance tool in international companies. Masoni et al. (2017) assessed how augmented reality helps the remote maintenance of equipment. And Strange and Zucchella (2017) demonstrated the potential impact of Industry 4.0 and its technologies on GVCs. The concentration of the above-mentioned studies on specific individual technologies implies that research has not provided a comprehensive view of how various types of digital technologies affect companies' international activities. Since most international companies integrate quite different digital technologies into their international activities, it is crucial to consider digitalization as the use of a complete set of digital technologies, encompassing not only the internet but also advanced technologies such as big data, AI, etc. Such an approach should provide the afore-mentioned comprehensive view of digitalization-internationalization relationship.

Furthermore, most research in the digitalization-internationalization field has focused on the opportunities of digital technologies for companies, resulting in "positive terms", whereby the challenges of implementing smart solutions in regard to cross-border activities are less highlighted (Verbeke & Hutzschenreuter, 2021, p. 607). The positive perspective alongside the lack of empirical examination have led to a great number of predictions and assumptions in the international business literature, putting disproportionate emphasis on the possible outcomes of using advanced technologies. As an illustration, the pioneering review of industry 4.0 by Strange and Zucchella (2017) suggests that the location of GVC activities will be significantly

altered due to the capabilities of automation and 3D printing (p. 174). Such a prediction relies only on the theoretical potentials of the above-mentioned technologies without addressing the current reality in the international business landscape or providing a timeline for the potential changes claimed by the authors.

In addition, many research gaps are also still present in the international business literature about the interplay between digitalization and internationalization-specific issues. International companies usually conduct a quite different array of cross-border business processes, from entering into new markets or locating GVC activities to international transfer of knowledge and managing global interdependencies. The use of digital technologies can have implications for each of these activities, affecting their efficacy. As a result, the above-mentioned research field still needs much attention to clarify the ambiguities.

Another motivation for this study lies in the possibly different impact of digital technologies across industries. Many studies in the international business literature have focused on digital companies when attempting to investigate the impact of digitalization on internationalization-specific issues (e.g., Banalieva & Dhanaraj, 2019; Brouthers et al., 2016; Li et al., 2019; Monaghan et al., 2020; Stallkamp & Schotter, 2021). Thus, much less is known about the influence of advanced solutions for traditional, usually larger, international companies. This is important because traditional companies now face fierce competition from new digital ones (Strange et al., 2022, p. 3). Moreover, the advantages of implementing digital technologies seem to vary across industries, depending on how digitalized the industry and the company are. In this regard, digital companies are usually a part of digital industries with their GVC activities being highly digital. On the other hand, traditional, typically manufacturing, companies may use digital technologies in various business areas to benefit from its advantages; however, they can still encounter difficulties due to higher transaction costs and geographic distances as a result of their products being physical and bounded to specific locations (Drori et al., 2024, p. 4). Since the research is scarce in this respect, it would be interesting to identify the differences between various industries.

As a result of the above-mentioned issues, the research field of digitalization is quite fragmented and unstructured in the international business literature. To address this issue, this research project positions itself at the forefront of exploring the impact of digital technologies on international business by not only considering digitalization as a composite phenomenon, but also examining how the specific features of digital technologies change companies' international

business processes. Moreover, it will be attempted to empirically assess some of the digitalization-related predictions and assumptions in the international business literature, fill several research gaps, and include the role of different industries as a context variable. At the end, a comprehensive view should be provided, encompassing various types of international activities in different types of international companies.

1.2 Aim and Objectives of the Study

As described in the previous section, digital technologies play a central role in the digitalization of business processes and significantly influence the today's international business landscape. However, the employment of these technologies raises critical questions about how international companies leverage digital technologies to enhance operational efficiency and streamline their cross-border activities. Due to the lack of empirical examination and a comprehensive view of the matter, this research project seeks to address the afore-mentioned issues in the literature by outlining a new approach to the investigation of digitalization-internationalization relationship.

To this end, four research questions are developed, aiming to encompass a wide spectrum of companies' internationalization-specific activities. These questions represent quite different areas of international business and should provide a general picture of how the use of digital technologies affects international companies and their cross-border operations.

The first question deals with the configuration of GVCs. Today's value chains are highly dispersed and spread around the world in different locations. Accordingly, GVC activities are also fragmented. In this regard, technologies such as robots and 3D printing can change production systems by decoupling humans from the process, while technologies such as the internet and cloud can connect global activities, fostering communication and coordination between locations. Consequently, the configuration of GVCs and the location of activities may significantly be altered, leading to more fragmentation, whereby components of GVCs can be relocated. Thus, the first research question is formulated as follows:

- 1) How and to which extent does the use of digital technologies influence companies' location of international activities/the configuration of the GVC?

The second research question refers to internationalization-specific decision-making. The remote access to distant markets through the internet has provided international companies with a more efficient way of internationalization, facilitating market entries and presence. Moreover,

technologies such as big data and AI can help companies analyze and predict trends in local markets, enabling a better adaptation of products to local needs. In addition, digitalization has allowed smaller local companies from emerging markets to introduce innovative solutions and compete with larger companies, which are typically operating in various markets, forcing these companies to rethink their international strategies. As a result, it was important to include the following research question into the study:

- 2) How and to which extent does the use of digital technologies influence companies' internationalization decisions in general?

The third research question concerns with the role of foreign subsidiaries in the digitalization process. Subsidiaries are an important part of international companies and can vary in terms of capabilities, including advancements in digital infrastructure and expertise. More importantly, digital technologies such as cloud and digital working platforms allow for collaborations across borders, which can enable subsidiaries to be involved in the development of digital solutions. In addition, companies are partnering with local startups to acquire advanced technologies and innovative solutions. This raises the question whether foreign subsidiaries are involved in such a partnership. The above-mentioned examples imply that the role of foreign subsidiaries may be changed as a result of the extensive use of digital technologies. Therefore, the third research question is designed with this purpose in mind:

- 3) How and to which extent does the use of digital technologies influence companies' foreign subsidiaries and their roles?

The last research question focuses on the management of global interdependencies. Digital technologies have the ability to significantly change this management. Technologies such as cloud and IoT can connect employees, assets, and locations, enhancing the coordination of international activities. On the other hand, technologies such as AI and blockchain can facilitate the governance of cross-border activities by predicting frauds and remotely controlling suppliers and equipment in supply chains. In addition, digital platforms are believed to fundamentally change governance and coordination systems. Hence, the fourth research question addresses these types of international activities as follows:

- 4) How and to which extent does the use of digital technologies influence companies' governance/management/coordination modes?

Overall, the aim of this research project is to broaden the current knowledge of the interplay between digitalization and internationalization. To this end, it will be extensively explored how the use of digital technologies by international companies affects their cross-border operations.

1.3 Structure of the Study

To describe the terminology and present the findings, the rest of this dissertation is organized as follows. The next chapter defines the terms “digital technology” and “international company”, and demonstrates their relevance for the topic. This is crucial because similar terms are used interchangeably in the literature regarding digital technologies, leading to confusion if not properly distinguished. Moreover, this study includes both digital and traditional, mostly manufacturing, companies which are operating in international markets. Thus, it is necessary to provide a distinct definition, comprising both types of company.

The third chapter is divided into four sections. In the first section, a theoretical framework is provided, where several management-related theories and concepts are discussed. More specifically, scholars in the international business literature have long relied on specific theories such as the internalization theory to interpret and explain the peculiarities of international business. Recently, newer concepts such as digital ecosystems and platforms have been added to this set of useful tools. These theories and concepts are crucial to interpret and explain the impact of digital technologies on international activities, as their relevance will be indicated later during the discussion. In the second section, a conceptual framework is proposed based on the four research questions introduced previously. This framework aims to outline the direction of this research project by providing detailed explanation of the related literature, peculiarities, assumptions, and research gaps regarding each of the four research questions. In the third section, the position of the study in the international business literature is clarified based on the provided conceptual framework. In the fourth section, an attempt is taken to link the theoretical framework to the conceptual framework by justifying how the introduced theories and concepts help answer the four research questions.

The methodology of the study is described in the fourth chapter. To this end, the advantages and suitability of qualitative research as the approach of this study will be shown while a differentiation between grounded theory and qualitative content analysis as the two established methods of qualitative research will be provided. Next, the processes of data collection and data analysis is thoroughly discussed.

The fifth chapter presents the results of the study. The results will be discussed under four research categories, each of which represents one of the research questions. This procedure ensures a structured approach, attempting to make the discussion easy to follow and understandable. Each of the four research categories comprises several inductively extracted aspects from the qualitative material to showcase how the use of digital technologies affects international activities. In the final section of the chapter, a summary will be provided, connecting the dots and explicitly answering the four research questions.

Based on the given results, the sixth chapter introduces a model and a paradox to generalize the findings. In this regard, the model incorporates the most important aspects discussed in the previous chapter to provide a comprehensive view of the impact of digital technologies on international activities, as one of the objectives of this research project. The paradox, on the other hand, addresses a more general trend found in the findings, which hints at a tension between global and local approaches while developing digital solutions.

Finally, the conclusion is drawn in the seventh chapter. After summarizing the findings, the chapter continues to discuss the theoretical contribution of the study and implications for managers. At the end, the possible limitations of the research project are described while opportunities for future research are highlighted.

2 Definition of Central Concepts

In order to develop a comprehensive discussion of the role of digital technologies in the context of international business activities, it is necessary to define related terms and outline their relevance for the topic. Without a solid understanding of these terms and their relations, the underlying logic of provided arguments regarding the core discussion in the following sections of this dissertation may demonstrate ambiguity and inconsistency due to similarities in terminology. Thus, the central concepts of the topic will be explained in this chapter.

2.1 Digital Technologies in the Context of Companies' Business Activities

Digital technologies are the core element of investigation in this research project. They encompass a vast array of innovations and tools that have increasingly become integral to business operations, driving significant transformations across companies and industries. Despite their widespread use, there remains a lack of consensus on a precise definition in the literature. More importantly, a specific definition in the context of business is needed for a comprehensive analysis of how digital technologies affect companies' business activities. Therefore, digital technologies and their associated terms will be defined in this section.

2.1.1 Digitization, Digitalization, and Digital Transformation

An attempt to describe digital technologies in the field of management studies leads to the discussion of digitalization as well, since digital technologies are the basis and the main driver of digitalization. Therefore, defining digitalization seems to be inevitable to enhance our understanding of digital technologies in the context of companies' business activities.

Moreover, a search in the literature shows how closely digitalization is related to two other terms, namely digitization and digital transformation. Indeed, the three terms are often used interchangeably (Gong & Ribiere, 2021, p. 2; Gradillas & Thomas, 2023, p. 1; Kraus et al., 2022, p. 2). The reason lies behind different interpretations in various research fields (Verhoef et al., 2021, p. 889) and the lack of a unified definition of these terms in the literature.

Since the above-mentioned three terms are tightly interconnected and demonstrate the way that digital technologies are employed regarding companies' business activities (Gong & Ribiere, 2021, p. 2), which is highly relevant for this dissertation, it is necessary to explain them in the first step and illustrate their differences. In this regard, several authors have also put an emphasis on the necessity of clarifying their differences (Gong & Ribiere, 2021, p. 1; Gradillas & Thomas, 2023, p. 2; Kraus et al., 2022, p. 2; Legner et al., 2017, p. 301; Tilson et al., 2010,

p. 749). After describing the three terms and discussing the relation of digital technologies with them, in the next step, a definition of digital technologies in the context of business activities will be provided.

Digitization: As mentioned above, computers (and digital devices in general) are the necessary equipment to employ digital technologies. Since computers cannot understand human languages directly, they need a unique understandable language as an intermediary in order to be able to process the given information and tasks. Even today's advanced computer-based language models with the ability to conduct a conversation with humans need to convert human languages to their unique language at the first step. The base of this unique language are digits, or in other words 0 and 1, because computers can only identify if a phenomenon exists or not (0 for non-existence and 1 for existence). This is the reason why the language is known as the binary language.

Therefore, every analog information must be converted to the binary language in order to be understandable and usable by computers. The process of this conversion from analog forms to digital bits is called digitization (Tilson et al., 2010, p. 749; Verhoef et al., 2021, p. 891; Yoo et al., 2010, p. 725). To illustrate, converting a piece of analog music recorded on vinyl records into a digital form can be considered as digitization. A more advanced example is the creation of a digital twin of a manufacturing site.

According to this definition, digitization refers to the technical aspect of using digital technologies, which is associated with creating digital artifacts from physical items and activities (Graddillas & Thomas, 2023, p. 2). Once physical activities are digitized, they give physical devices (e.g., robots, smartphones, or even automobiles) the ability to understand real-world measurements such as location, movement, temperature, etc. (Saarikko et al., 2020, p. 828).

As the core of this process, digital technologies enable physical products to be more capable. In the same manner, they result in more efficiency of business activities. For instance, early manufacturing robots, as physical devices capable of understanding real-world measurements such as movements, helped companies increase their production rates and decrease their costs in the early 1960s. However, the early digital technologies only represented their existing analog systems and were bounded to specific tasks due to their restricted capabilities (Tilson et al., 2010, pp. 749–750). This was the beginning of an era and was then truly exploited, as different devices, parts, and elements of business were capable of communicating with each other, which was possible due to the introduction of the internet, as a digital technology.

Despite of the digital technologies' ability to increase efficiency, digitization alone does not alter value creation (Verhoef et al., 2021, p. 891), because it only refers to the technical process of converting analog to digital. Similarly, it does not directly affect the core business of a company (Gobble, 2018, p. 66), since digitization does not change value creation or business strategies in companies, although it can affect them indirectly. In this regard, other terminologies and explanations are needed to understand the relation between digital technologies, digitization, and business activities.

Digitalization: In contrast to digitization, a clear unified definition of digitalization does not exist in the literature due to different interpretations of researchers. For instance, researchers of information systems might be primarily concerned about technological adoption in organizations whereas marketing researchers usually address digital advertising and the communication part of a business (Verhoef et al., 2021, p. 889).

Despite the lack of a unified definition, digitalization can be commonly considered as the second part of a procedure, in which digital artifacts are utilized to alter processes. Those digital artifacts are digitized by technologies (digitization). As an illustration, physical movements of a robot in a manufacturing site can be converted to digital form by sensors (a technology), or the conversation of customers with the customer service of a company can be recorded and written down by artificial intelligence (another technology).

In this view, digitization represents a technology whereas digitalization discusses the relevance of the technology for organizations (Saarikko et al., 2020, p. 828), by which business processes are transformed and efficiency is increased. Indeed, digitalization mainly refers to the use of digital technologies and digital assets to create value, optimize business activities (Kraus et al., 2022, p. 2), and increase the performance of organizations (Kuusisto, 2017, p. 342).

More importantly, digitalization benefits from digital information because digitization causes all information to have the same form and hence, they can be used by various digital devices and machines (Tilson et al., 2010, p. 749). For example, a piece of scanned financial report paper can be stored on and accessed by a computer, a smartphone, or the cloud. This enables machines and processes to communicate with each other, since they employ the same format and language. The communication then assumes a more efficient coordination between processes. This suggests that digitalization refers to the use of digital technologies to improve existing and create new business activities by adopting a more effective and cost-saving coordination between them, and also create new connections between customers and companies,

which increase value for customers by enhancing their experience (Pagani & Pardo, 2017, p. 189). This explanation of digitalization seems to be more accurate and presents a higher relevance for companies and business operations, since it also considers value creation and customers' experiences (Verhoef et al., 2021, p. 891).

To express a clear illustration for digitalization and referring back to the afore-mentioned example of converting a piece of analog music recorded on vinyl records (digitization), the digital form enables businesses and music owners to reduce costs by producing thousand pieces of that music with just one click and increase the efficiency by selling it via multiple channels. On the other hand, it gives customers the ability to listen to that music on various devices, store it on the cloud, or share it with other devices and people. This creates value for customers and enhances their experience (digitalization).

Overall, all the above-mentioned definitions have one similar aspect, which is the use of digital technologies to change business processes. Therefore, it can be concluded that digitalization stresses the real-world application of digitization in organizations, and value creation for business purposes.

Digital Transformation: Digitalization and digital transformation also present comparable characteristics and hence confusion. However, there are important conceptual differences and several authors have attempted to distinguish them by providing a comprehensive definition of digital transformation (Gong & Ribiere, 2021; Kraus et al., 2022; Saarikko et al., 2020; Verhoef et al., 2021; Vial, 2019).

Digital transformation is the third part of the procedure and beyond simply optimizing business processes (Verhoef et al., 2021, p. 891). It affects the whole organization (and not just business processes) and aims at recognizing market changes and adapting to them quickly (Gobble, 2018, p. 66). This means digital transformation raises strategical thinking and implies changes in the core business model of a company trying to digitally transform itself. Thus, it does not refer to only technological changes, but rather decision-making at the top of a company and the way of conducting business.

Digital transformation is hence about transforming the business, which requires structural and cultural changes (Verhoef et al., 2021, p. 889; Vial, 2019, p. 127), and alters technical architectures, methods, business models, and strategies (Legner et al., 2017, p. 303). In other words, digital transformation is defined as the use of digital technologies to advance a new business model, which ultimately enables companies to create value (Verhoef et al., 2021, p. 889). This

definition involves digitization as well as digitalization and considers them as two layers of digital transformation.

To illustrate, it was previously stated that the digital form of a vinyl record creates value for customers, since the music can be accessed on different devices. In this matter, online music streaming services such as Spotify with their new business models based on digital access to music are the clear example of digital transformation. These streaming services have changed the traditional business models in the music industry through digitalization.

Further, a digital change in business models and strategies represents a change in organizational structures. This implies digital alterations in a company's organizational setup and especially the integration of new business activities within the structure (Matt et al., 2015, p. 341), meaning that digitizing processes and products, as the result of employing digital technologies, has the ability to change the way a company does business and forces the company to adapt its structure in order to be able to accept new digital activities. In this regard, digital transformation can also be understood as the process of adapting to these organizational changes, which is crucial for companies to remain competitive in the digital era (Saarikko et al., 2020, p. 829).

More importantly, digitizing individual business processes without having a clear strategy is mainly a concern regarding digital transformation of companies (Saarikko et al., 2020, p. 833). As a result, "a clear roadmap driven by a digital strategy" is needed for a successful digital transformation (Gobble, 2018, p. 66). A digital strategy does not then isolate digitization and digitalization, but considers them as tools to restructure the company and make it responsive to its environment. Thus, digital strategy outlines the path of digital transformation and the integration of new business activities derived from the use of digital technologies (Matt et al., 2015, p. 340).

A clear definition of digital transformation, which includes all the above-mentioned aspects, considers it as "a fundamental change process, enabled by the innovative use of digital technologies accompanied by the strategic leverage of key resources and capabilities, aiming to radically improve an organization and redefine its value proposition" (Gong & Ribiere, 2021, p. 12). The redefinition of value proposition usually proposes the need for new digital assets such as big data (Verhoef et al., 2021, p. 892), which companies utilize to develop new digital solutions. Therefore, acquiring digital assets is also a part of digital transformation and strategically important for companies. The reason lies in the fact that without digital resources and

especially data, the innovative use of digital technologies is inconceivable in today's competitive market environment. Accordingly, companies should enhance their understanding of which specific resources are needed, which strategies are suitable, and how their structure should be adapted for a prominent digital growth.

As described, digitization, digitalization, and digital transformation are interconnected and build together the transformation path of a company in the digital era. Digital technologies are not only the main tool for this process, but also one of the driving factors for it (as shown by Verhoef et al., 2021, p. 890). However, digital technology is a general term, as mentioned before, and has various implications and usage in different research fields. Thus, it seems beneficial to define it in the context of business to provide a relevant definition for the purpose of this dissertation. This enhances the understanding of discussions about the impact of digital technologies on companies' business activities.

Therefore, digital technologies, in the context of business, will be defined as: "Tools, systems, and resources that convert analog signals into electronic forms to create and process information, facilitating innovative solutions to improve business operations and develop a new business model".

This definition ensures that the afore-mentioned aspects of digitization, digitalization, and digital transformation, as the main blocks of using digital technologies in companies, are included. It considers digital technologies as companies' capabilities to employ digitized information as resources in order to optimize business activities and create value, which in turn lead to a change in the core business of the company.

2.1.2 The Relevance of Digital Technologies for Companies' Business Activities

It is crucial to outline a clear line between the afore-mentioned explanations and the topic of this dissertation. In other words, there is a need to clarify how digitization, digitalization, and digital transformation are relevant for companies' business activities and what the role of digital technologies is in this context.

To visualize the relevance of digital technologies for companies' business activities, the digital transformation pyramid (figure 1) distinguishes between three layers of enabling technologies, corporate execution, and business strategy (Turchi, 2018). These three layers correspond to digitization, digitalization, and digital transformation introduced in the last section.

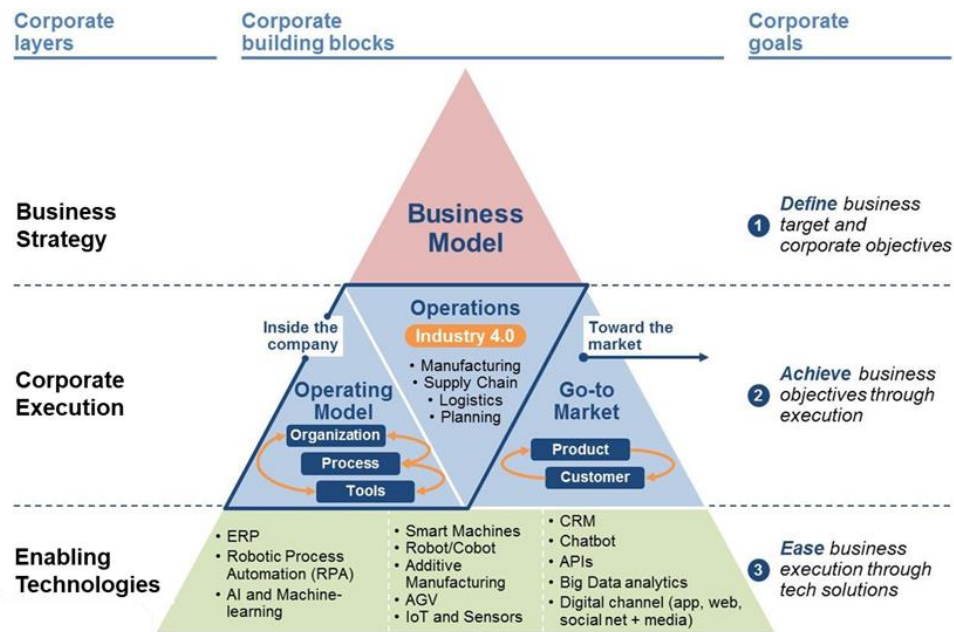


Figure 1: The Digital Transformation Pyramid (Turchi, 2018)

The three layers shown in the pyramid are in line with steps and stages provided by the literature, in which digitization and digitalization are considered as two sub-layers of digital transformation (Saarikko et al., 2020, p. 828), two phases before digital transformation (Verhoef et al., 2021, p. 891), or as parts of a conceptual diagram to reach digital transformation (Gong & Ribiere, 2021, p. 12).

In the first layer of the pyramid, enabling (digital) technologies allow the converting of analog data. Here, “the information will be digitized” (Bloomberg, 2018, p. 8). For instance, IoT and sensors are used to convert the physical location of a specific component in the production line to digital form and make it accessible on computers. This primarily refers to the technical process of using digital technologies in companies.

Since digitization in companies is mostly about advanced technologies such as robotics, big data analytics, or AI, technical expertise is essential to develop the related solutions. However, not always is the required technical expertise related to the core business and hence, it can be accomplished through collaboration, outsourcing, or by a small group of experts. As a result, digitization is in many cases isolated in organizations (Saarikko et al., 2020, p. 828). This is the reason why collaboration with technology-based companies and startups is frequently stressed by experts in the digital era.

In the next layer, the focus is on business processes. By digitalization, digital technologies and digitized information will be employed to optimize internal and external business operations. Here, “we digitalize processes and roles that make up the operations” (Bloomberg, 2018, p. 26).

For instance, the identified location of components via IoT enables companies to reduce their costs by an optimized inventory management or increase the efficiency by predicting the arrival of specific components into the production line. Regarding external processes, the identified location has the ability to create value for customers, since they can be shown in which step the production of their product currently is and when exactly their product will be delivered. This suggests that digitalization is about standardization, by which companies establish new systems of operations.

Digitalization, as the central step of a company's digital journey, is of high relevance for this dissertation because it directly addresses the use of digital technologies for changing business activities (international activities included). In the same way, this dissertation is concentrated on business activities, which consist of activities for internal use or those aimed at improving customers' experience.

The last layer is the broad overview of digitalization processes and demonstrates how the use of digital technologies can lead to the development of new business models. Indeed, digital transformation is tied with changes in the core business and strategies due to the use of digital technologies (Verhoef et al., 2021, p. 892). Here, "we digitally transform the business and its strategy" (Bloomberg, 2018, p. 26). For instance, the use of IoT for identifying components in the supply chain together with other solutions such as connected automobiles can lead to a whole new business model, in which an automobile manufacturer shifts its core business to be a mobility service provider. It should be noted that digitalization of one process, such as identifying the location of components, usually cannot affect the business model, but rather a combination of different digital solutions leads to the change. The reason lies in the fact that digital transformation is a company-wide change (Verhoef et al., 2021, p. 891) and cannot be emerged from individual processes.

While digitalization happens at the operational level, digital transformation is linked with the impact of digital technologies at the strategic level (Gong & Ribiere, 2021, p. 2). In addition to the relevance of digitalization and its direct impact on international operations, digital transformation is also relevant for this dissertation, since companies' digital strategies affect their business activities and how they conduct business, which in turn have influence on international operations as well. Thus, companies' strategies and goals regarding the use of digital technologies will also be pointed later in different sections.

2.2 International Companies and their Cross-border Activities

The landscape of international business has been widely transformed in recent decades – and especially in recent years – not only due to the advancements in digital technologies, but also due to the increasing complexity of global markets, which in turn is a consequence of the increasing importance of digitalization. International companies, characterized by their cross-border activities and presence in foreign markets, play an important role in this globalized economy. Correspondingly, they have undergone significant changes in their structure and characteristics. This section discusses different terminologies of international companies and sheds light on the relevance of digital technologies for their cross-border operations.

2.2.1 Definition of the Term “International Company”: The Concept of Internationalization

Similar to digitalization, there are several terms regarding international companies, which are commonly used interchangeably in the international business literature. Multinational corporation (MNC), multinational enterprise, transnational corporation, and global corporation are among those terms (Aggarwal et al., 2011, p. 557). In most cases, the terms international, multinational, transnational, and global play the role of adjective, while business, company, corporation, enterprise, and firm the role of the noun (Wilkins, 2009, p. 5), which all point at cross-border activities of an organization. Throughout this dissertation, the term MNC will be used to refer to these types of traditional international companies. On the other hand, there are new types of international companies, which exploit the use of digital technologies and the digital business environment to expand their operations and are characterized by their early internationalization. Their difference will be highlighted in this section due to their relevance for further discussion.

An MNC is a company that holds foreign direct investment (FDI) by owning and/or governing their cross-border operations in host countries (Dunning & Lundan, 2008, p. 3). Such a company typically manages a group of organizations (business units), including its headquarters and foreign subsidiaries, geographically distributed in dispersed locations (Ghoshal & Bartlett, 1990, p. 603). These foreign subsidiaries are either largely independent, which provide products mainly for local markets, or are considered as a subunit of a global network of value creation (Dunning & Lundan, 2008, p. 3). In this view, foreign subsidiaries are considered as an inter-organizational network, which itself belongs to an external network of customers, suppliers, regulators, etc. (Ghoshal & Bartlett, 1990, p. 603).

The international presence and operations of an MNC are crucial elements to define such companies. This implies that the existence of MNCs is tied with the concept of internationalization. Thus, it is necessary to determine the level of internationalization and how international the MNC is. To this end, many indicators have been introduced in the literature as diverse as foreign sales, foreign assets, and the number of foreign subsidiaries or employees (Aggarwal et al., 2011, p. 558). Table 1 provides an overview of such indicators for the degree of internationality.

MNCs are historically viewed as large corporations with extensive international operations around the world alongside having international vision and strategy (Aggarwal et al., 2011, p. 557). However, the demonstrated indicators suggest that MNCs largely vary in terms of size and the scale of international activities. Indeed, the lack of a unified approach to determine what an international company is, has resulted in highly dissimilar companies being considered as an MNC (Aggarwal et al., 2011, p. 561).

Table 1: Indicators of Companies' Internationality

Number	Indicator	Description
1	Foreign subsidiaries	The number and size of foreign subsidiaries
2	Countries	The number of countries, in which the company has value-added activities
3	Foreign assets, sales, and employees	The proportion of foreign assets, sales, and employment to global ones
4	Managers and owners	The degree of internationality of the company's management or ownership
5	Higher-value activities	The degree of internationality of higher-value activities
6	Local advantages	The extent of the systemic advantages due to governance of global value creation network
7	Independency of foreign subsidiaries	The extent of independency of foreign subsidiaries in value creating and decision-making

Source: (Dunning & Lundan, 2008, p. 3)

To determine the internationality of a company, most studies utilize a combination of above-mentioned indicators such as foreign assets and foreign employment (Dunning & Lundan, 2008, p. 4). In fact, the number of foreign employees and foreign subsidiaries among with foreign sales are the most common composite measuring of international companies (Aggarwal et al., 2011, p. 559).

Nevertheless, to avoid such complexity in defining international companies, Aggarwal et al. (2011) have suggested a classification system, which not only includes the known types of international companies, but also can cover the emergence of new ones. The system comprises the extent of geographic spread and the depth of market engagement. The former identifies in which countries, regions, or global market the company conducts activities; the latter is concerned with the level of commitment in foreign markets (Aggarwal et al., 2011, p. 561). This commitment ranges from export, licensing, and franchising to operating offices, alliances, and establishing FDI (Aggarwal et al., 2011, p. 563).

Regarding the geographic spread, a regional grouping will be used as an appropriate approach to identify the geographic spread of an international company (Aggarwal et al., 2011, p. 562). The reason lies in the fact that the grouping of countries under physical contiguity recognizes their shared properties such as culture or preferences (Aguilera et al., 2007, p. 216). This is in line with Johanson and Vahlne (1977)'s consideration of culture, language, education, and industrial development as challenging factors of conducting international activities in foreign markets (p. 24). As a result, a company should be considered more international if it conducts business in more regions with different shared properties.

Moreover, MNCs are usually engaged in different cross-border economic activities such as joint ventures or licensing agreements with suppliers and industrial customers, all of which address their foreign value-added activities (Dunning & Lundan, 2008, p. 5). Indeed, value-added activities are an important element to describe companies, because everything a company does should be represented by these activities, which together build the value chain of a company (Porter, 1985, p. 48). The value chain stands for all activities that a company goes through to transform conceptions to final products and services for the end use and after support, including traditional or new digital activities (Vadana et al., 2019, p. 203). This system is defined by primary and support activities; the former includes logistics, operations, marketing, and service; and the latter, procurement, technology development, human resources, and company infrastructure (Porter, 1985, p. 37).

In this regard, international companies are known to go through an evolutionary process, in which they locate each part of their value chain in specific host countries while they attempt to internationalize their business. Indeed, MNCs are characterized by an increasing proportion of their value chain activities being performed outside of the home country (Dunning & Lundan, 2008, p. 6). To illustrate, an Italian company might begin with exporting its product to the USA and having all the major value chain activities in the home country. After a while and with

increasing sales in the USA, it might open an office in the host country responsible for marketing of that market. The next stage of growth would be establishing local production. At the end, this leads to a fully autonomous foreign subsidiary in the USA with all value chain elements, from marketing and service to research and development (R&D) of local products for the host country. Certainly, the decision of commitment depends on the financial importance of each foreign market (Aggarwal et al., 2011, p. 567).

This staged internationalization of companies is identified as an incremental process, which is a result of the need for adjustment to companies' environment and is derived by learning and gathering information in foreign markets. The reason for the step-wise progress lies in the lack of information about foreign markets, which may be mainly obtained by conducting operations in those markets (Johanson & Vahlne, 1977, p. 23). The lack of information can also be a consequence of less internationally experienced managers and international managing skills (Johanson & Vahlne, 1977, pp. 28–29).

Given the differences in language and cultures, companies have faced with difficulty of gaining knowledge about foreign markets. The challenge was intensified by the slow speed of communication and transportation in the past (Oviatt & McDougall, 2005, p. 32). In fact, communication and transport inhibited many companies to internationalize in the past (Aggarwal et al., 2011, p. 557). However, the technological advancement in communication (especially the advent of the internet) and also in transportation (faster and more efficient transport of people and products) has eliminated the above-mentioned obstacles of gathering information (Aggarwal et al., 2011, p. 557; Oviatt & McDougall, 2005, p. 29). Furthermore, advanced technologies in production and logistics have resulted in decreased transaction costs and increased international trading (Knight & Cavusgil, 2004, p. 125). These low-cost advantages have enabled new small companies (or ventures) to find business opportunities in foreign markets and compete internationally, meaning that the capacity of internationalization is not anymore restricted to large MNCs with considerable available resources (Oviatt & McDougall, 2005, p. 29). Thus, many new ventures and start-ups have the ability to sell – or even manufacture – their products and services outside the home country shortly after the company's foundation, leading to a new form of international companies known as international new venture (INV) (Oviatt & McDougall, 1994).

INVs are defined as companies that seek international competitive advantage in foreign markets from inception (Oviatt & McDougall, 2005, p. 31). This highlights the time of internationalization rather than the scale of international presence, which challenges the afore-mentioned staged

internationalization of companies (Aggarwal et al., 2011, p. 568). Contrary to traditional MNCs, INVs commonly have a proactive internationalization strategy from the beginning, but often do not engage in FDI (Oviatt & McDougall, 2005, p. 31). The youth of such companies means that they typically lack essential financial, human, equipment, and physical resources – the tangible resources, which typically enable traditional MNCs to increase their presence and performance in foreign countries (Knight & Cavusgil, 2004, p. 127).

Despite the limited access to resources and the lack of owning foreign assets, these small companies (also known as born-global) employ technology, innovation, and knowledge to gain competitive advantage in foreign markets, meaning that knowledge-based resources are associated with their performance in foreign countries (Knight & Cavusgil, 2004, p. 124). The employment of intangible resources, which is tied with technology and knowledge, implies that they typically represent high-tech companies with superior technological advancements. In this regard, technological knowledge as digital information can be transferred through the internet to other countries. This is the reason why the majority of INVs are of digital nature. They are known as born digitals and are derived from today's highly digitalized world.

Born-digital companies are identified as companies that not only offer their products and services through the internet (Brouthers et al., 2016, p. 513), but also conduct the majority of their value chain activities online (Vadana et al., 2019, p. 200). In other words, they are digitalized companies from inception. Such a company is dependent on digital technologies for its operations, manufacturing, and delivery processes (Monaghan et al., 2020, p. 12). These processes include both inward and outward activities of their value chain, which all are internet-enabled (Vadana et al., 2019, p. 200). As an illustration, Airbnb is a well-known example of such companies. It is a digital platform that connects landlords and tenants using digital technologies such as cloud and AI algorithms. Its primary value chain activities are performed online, including logistics, operations, marketing, and service. This has enabled Airbnb to internationally expand its business at a considerable speed and be active as a US company in almost all foreign markets (more than 220 countries), in spite of not owning any substantial FDI, but only several offices around the world.

Although having a digital structure (like Airbnb's digital platform) indicates the online presence of the company, parts of the organization are, in most cases, to be found in physical places, such as the mentioned Airbnb's offices, or even data centers. However, this form of physical footprint is different from traditional FDI and manufacturing sites, which typically need much higher investments (Monaghan et al., 2020, p. 12).

Born-digital companies are highly relevant for this research project because they are new forms of international companies with vast employment of digital technologies, which affects their international business activities as well. Moreover, they largely differ from traditional brick-and-mortar companies that have become digital after years of conducting business or from those that are still attempting to become digital by going through digital transformation (Monaghan et al., 2020, p. 13). The investigation of both MNCs and INVs (mostly born digitals) will enhance our understanding of different impacts the use of digital technologies might have on different types of international companies. Furthermore, MNCs are partnering more and more with digital companies due to their technological advantages and are applying more and more of their business methods to remain agile and competitive in foreign markets. In many cases, they even establish digital companies inside their organization as their subunit to focus on software development and digital technologies. Hence, it makes sense to examine both company types and distinguish between them regarding their international operations.

In conclusion, MNCs have been the central unit of analysis in international business research. There is a vast amount of literature on their characteristics, structures, operations, and even reason of existence. However, digitalization has changed the international business landscape and has provided smaller companies with the ability to disrupt the industry, in which they are operating. This has led to the introduction of a new internationality concept, and hence has broadened the definition, indicators, and types of international companies (Aggarwal et al., 2011, p. 558). As a result, the international business research has evolved and embraced new categories of international companies, reflecting the dynamic nature of the digital era and the companies' adoption of digital technologies.

2.2.2 The Relevance of Digital Technologies for International Business Activities

Undoubtedly, digital technologies have the ability to change industries and create a new international business landscape. However, their impact is deeper at the organizational and operational level of companies. As discussed in section 2.1 and shown in figure 1, companies use digital technologies to digitalize their business processes. This is primarily related to digitalizing different elements of the GVC and encompasses the digitalization of various components, including production, logistics, marketing, and service. By digitizing processes, MNCs can streamline operations and enhance information flows across borders.

The relevance of employing digital technologies for international companies and their business activities can be discussed under two dimensions: efficiency and connectivity. Efficiency mostly refers to optimizing business processes, creating innovative solutions, and increasing

transparency in decision-making. Connectivity, on the other hand, is about linking companies' international activities from different locations.

To illustrate, table 2 demonstrates possible implications of several important digital technologies (including IoT, robotics, 3D printing, blockchain, augmented and virtual reality, big data, AI, and cloud), showcasing their potential for improving international business activities. These implications are mostly related to the GVC of MNCs and stress the importance of merging new digital solutions with the existing and established network of international activities.

The extent to which processes are digitalized in the value chain significantly influences the benefits that MNCs can reap internationally. The more business processes are digitalized, the more standardized the processes become, which in turn enhances the coordination of globally dispersed activities and allows efficient communication between employees, machines, and processes. Moreover, location specificity may be affected, since digitalized processes can be conducted from anywhere, and hence are less location-bound. Increased efficiency is also emerged from cost reductions, which is possible due to decoupling humans and locations from digitalized tasks. In addition, more data are available for analysis by digitalizing more processes, leading to better insights and enhanced decision-making. Such data can be used to optimize operations, predict global market trends, and personalize customer experience.

Connectivity is probably one of the most important aspects emerged from the use of digital technologies in international companies. Digital technologies such as the internet and cloud enable a high degree of connection between globally dispersed activities. This has the potential to redefine MNCs' strategic decisions about location choices, business models, and organization of value chain activities, since digital connectedness comprises both flows of data and information, and flows of products and services that are digitally enabled (Luo, 2022b, p. 963).

Moreover, digital connectivity enables MNCs to enhance their inter-company and intra-company linkages. In this regard, collaborations with global partners are fostered due to the increased virtual connectedness; on the other hand, easier intra-company linkages help MNCs integrate partners and suppliers within their network more efficiently, reduce the costs of international interactions, and reorganize GVC activities (Luo, 2021, pp. 2–4).

Table 2: Possible Implications of Digital Technologies in International Companies

Digital Technology	Implications	Description
IoT	GVC governance	Automatic synchronization of cross-border components flows with their corresponding information flows within GVCs, leading to significant efficiency gains (Strange & Zucchella, 2017, p. 175)
		Standardized internal coordination of global suppliers by gaining information about origin, use, and destination of components provided by suppliers (Ahi et al., 2022, p. 8)
Robotics	Quality monitoring of global suppliers, manufacturing location	Monitoring of global suppliers regarding their performance and quality by connected robots, since robots have standardized processes and hence quality (Ancarani et al., 2019, p. 368)
		Potential to affect decisions on manufacturing locations due to lower cost of conducting labor-intensive activities by robots (Strange & Zucchella, 2017, p. 177)
3D Printing	Manufacturing location	Possibility of application in any places; low-cost production of small components and hence high customization of products for different preferences; potential to decrease production processes and time, allowing for flexible decisions on reconfiguration of GVCs (Strange & Zucchella, 2017, p. 177)
Blockchain	Standardization of global processes, trust building between global partners	Standardization of contracts and elimination of errors and fraud, increasing the speed of cross-border transactions and reducing transaction costs (Torres de Oliveira et al., 2020, pp. 146–148)
		Non-location bound trust building and broadening the scope of information provided and accessible by foreign partners (Nambisan et al., 2019, p. 1478)
Augmented and Virtual Reality	Training of international employees	Adaptation of employees' behavior to other cultures without the need for physical presence or traveling to other places (Ahi et al., 2022, p. 9)
Big Data	Recognition of trends and local needs	Tracking emerging trends in foreign markets without going through time-consuming learning processes resulted from resource commitments in local markets (Strange & Zucchella, 2017, p. 176)
		Identifying local needs and preferences using complex data sets, hence adjusting international marketing decisions to cross-border markets (Gnizy, 2019, p. 334)
AI	Demand forecasting, automatic analysis, dynamic pricing for foreign markets	Precise demand forecasting in global supply chain and logistics; automation in analyzing the data about customers' behavior, enhancing digital marketing strategies; recognizing the center of customers' attention in each market or even the right time to contact them in addition to dynamic pricing (Dash et al., 2019, pp. 45–47)
Cloud	Connecting international markets and internal network of companies	Better management of global resources, leading to a new form of infrastructure, by which home and host countries are interconnected (Luo, 2021, p. 2)
		Storing and accessing the data from around the world, facilitating the coordination of value chain activities (Ahi et al., 2022, p. 9)

Given the above, the extent to which international companies can exploit the advantages of connected cross-border activities depends on the level of digitalized business processes and the balance between online and offline value chain activities. Whereas a solely online presence represents the digitalization of the whole value chain activities, a solely offline presence refers to a value chain with only physical resources. In reality, the committed resources to these two sides vary in international companies and over time (Wentrup, 2016, p. 566). Accordingly, the more online components of the GVC are in different locations, the more possibilities there are for digital connectedness between globally dispersed components, and hence the higher the advantages derived from connectivity and the less location specificity.

The online presence and its resulted connectedness have also the ability to affect decentralization of activities, which requires high-level of knowledge (Autio et al., 2021, p. 9). Due to linkages between different locations (local clusters, foreign subsidiaries, etc.), human expertise can be employed more decentral and tacit knowledge can be transferred more efficiently (Alcácer et al., 2016, p. 504). Conversely, many GVC activities are routine tasks, which can be automated and hence be more centralized (Autio et al., 2021, p. 9). This together with advanced technologies such as AI enables MNCs to centrally govern their value chain activities across borders, since humans and location-specific elements are decoupled from the process.

The advantages emerged from efficiency and connectivity are also beneficial for INVs and born digitals. Since these companies already have highly digitalized value chain activities, they can employ innovative digital solutions to offer new products and services at lower costs, collaborate with other high-tech companies, and disrupt industries, while benefiting from connectivity, reaching more global customers, and expanding internationally more quickly. Moreover, born digitals tend to expand into markets with great access to digital technologies (Vadana et al., 2021, p. 2), since connectivity and access to digital technologies comprise their core business, without which they are not able to operate.

Overall, digital technologies are expected to bring competitive advantages not only due to their innovative solutions and cost reduction, but also due to the possibility of connected cross-border activities. This implies that the more digitalized the value chain activities are, the more connected those activities and hence foreign markets can become. Born digitals may take a great advantage, since they develop, create, and deliver products and services using the internet (Vadana et al., 2019, p. 202). Mature MNCs, which have gone digital long after inception, can also integrate their offline value chain with online activities (Vadana et al., 2020, p. 485), in order to exploit digitalization's advantages.

3 Review of Related Literature

There is a considerable amount of literature on internationalization of companies, both MNCs and INVs. Many theories have been introduced to explain the reason why companies internationalize and why MNCs exist. Digitalization has also been widely investigated in the literature, unsurprisingly due to its importance in the contemporary global economy. On the other hand, only few attempts have been made to theorize the role of digitalization in companies' internationalization, although digitalization has been gaining much attention in international business research. Most studies have applied the existing theories of companies' internationalization to discuss new phenomena in the digital era. To provide a clear theoretical framework for this dissertation, the first section of this chapter presents a few of most established and discussed theories in the literature regarding cross-border activities of companies and outlines, to which extent each theory is relevant for and able to evaluate new processes in digital environments. The second section then provides a conceptual framework to explore the impact of digital technologies on international business activities using the previously presented theories in the first section. The third section of this chapter draws the previous two sections together, introduces the research questions of the dissertation, and make the study's position in the literature clear. The last section ultimately demonstrates why and how the introduced theories and concepts help answer the research questions of the dissertation.

3.1 Theoretical Framework Based on (International) Management-related Theories and Concepts

Considering the role of digitalization in companies' international business, a few theories and concepts appear to be of particular importance for further discussion. The key point to select these theories and concepts is that they should be able to explain companies' international business. To this end, they should be able to cover both upstream and downstream sides of a value chain in companies' global network, controlling and transferring assets and knowledge within this network, and also costs and values, to which companies pay extra attention when setting their strategy of expanding to other markets. Moreover, digitalization-related theories and concepts are also needed in order to shed light on the relationship between digitalization and companies' international activities. More importantly, the united consideration of theories and concepts presented in this section is crucial because these theoretical foundations will be referenced again in the further course of this dissertation and will be analyzed with the empirically generated findings in the next chapters.

3.1.1 Transaction Cost Theory

Transaction cost theory (TCT), first conceptualized by Coase (1937) and further developed by Williamson (1975, 1985), has significantly influenced management research. Initially introduced to address the make-or-buy decisions, TCT has evolved and is now capable of explaining a wide range of phenomena, including strategic alliances, supply chain processes, and MNCs. Although not specifically developed for international transactions, scholars have used the TCT to describe specific characteristics and peculiarities of MNCs, such as governance choices in GVCs. Indeed, TCT is a powerful explanation to the scope of companies' international business activities (Hennart, 2010, p. 259).

TCT is grounded in the analysis of transactions between two entities – often demonstrated by the interactions between an upstream supplier and a downstream producer of a final product – and pursues the goal of determining which organizational form is the most efficient approach to manage a transaction based on its specific attributes (Nagle et al., 2020, p. 4). There are two fundamental approaches to manage a transaction, namely market and hierarchy (Coase, 1937, p. 394; Hennart, 2010, p. 259). When transactions are straightforward and non-specific, market is preferable because it incentivizes to produce at lower costs (Williamson, 1985, pp. 91–92). The market-based mechanism does this by rewarding trading partners for their output at market prices (Hennart, 2010, p. 259). On the other hand, when the specificity of assets increases and transactions become more complex, hierarchy is favored due to better coordination and conflict resolution through authoritative control (Williamson, 1985, p. 211).

Measuring outputs is necessary in the market-based mechanism, since this mechanism relies on price signals and competition to drive efficiency, however, if the measurement becomes costly due to opportunistic behavior of trading partners in order to acquire more rewards, the market system fails to manage transactions properly and make overpricing and undersupplying possible (Hennart, 2010, p. 259). More precisely, market-based mechanisms are not efficient when monitoring and evaluating trading partners or the product traded between them are costly (Nagle et al., 2020, p. 4).

This is even more crucial in cross-border transactions, since differences in languages, cultures, and regulatory environments make it more difficult to acquire information about trading partners in a foreign country and hence, information asymmetries lead to more complicated transactions with the potential for opportunistic behaviors (Cuervo-Cazurra et al., 2018, p. 214). In the same way, MNCs face with uncertain enforcement of contractual terms in international markets due to the mentioned differences. This makes the management of interdependencies

between trading partners critical and costly (Hennart, 2010, p. 257). The reason lies in the fact that transactions are subject to different legal, political, and judicial systems in each country (Cuervo-Cazurra et al., 2018, p. 215), which suggests that robust governance mechanisms are necessary in such cases and that market-based mechanisms are usually inefficient to manage such interdependencies.

Searching for international resources and suppliers, monitoring cross-border activities, organizing these activities, and adopting them within GVCs are a necessity for MNCs to operate and remain competitive. This inter-organizational and intra-organizational transactions suggest that MNCs engage in internal and external coordination, which are again associated with costs. Internal coordination costs are linked with communication and managing cross-border interdependencies within the network of an MNC, whereas external coordination costs refer to finding international suppliers and trading with them (Chen & Kamal, 2016, p. 566).

To illustrate, a Belgian company might be interested to acquire specific knowledge, such as an AI algorithm for predicting supply chain demands, from a Chinese startup, who has developed such knowledge and can license it to other companies. For this cooperation, both trading partners should collect information about each other, be able of setting a price for the knowledge, and agree on the terms of the contract. Due to the afore-mentioned differences and factors, organizing this interdependency in the two countries and ensuring that both trading partners hold the agreement's terms are associated with transaction costs, since one of the parties could engage in opportunistic behaviors. On the other hand, the AI algorithm has to be integrated to the Belgian company's global network to manage global supply chain demands. In this case, hierarchical mechanisms could reduce the costs because they apply control and governance mechanisms to manage the interdependency. Therefore, organizing such international interdependencies under unified ownership within the company can alleviate risks associated with market-based mechanisms (Nagle et al., 2020, p. 4).

Nevertheless, hierarchy also represents transaction costs. Since hierarchy rewards trading partners (typically employees) based on their behavior (Hennart, 2010, p. 259), behavior monitoring and control mechanisms are crucial and can be costly. In this regard, digital technologies have the ability to reduce transaction costs in both hierarchy or market systems (internal and external respectively). This occurs mostly due to digital technologies' capability of standardizing processes, which in turn makes exchanges easily measurable and interactions efficiently coordinated across international borders.

The ability of digital technologies to reduce transaction costs have important implications for international companies. To begin with, the standardization provided by digital technologies reduces the asset specificity costs by making processes non-location-bound, since digitalized processes can be conducted in any location (Autio et al., 2021, p. 8), lowering the cost of redeploying assets in different locations and contexts. This is crucial for the internationalization of companies because digital assets and digitalized processes can reduce the need for costly physical market entry (Autio & Zander, 2016, p. 4). In other words, this can enable companies to operate internationally without establishing subsidiaries in foreign markets.

Furthermore, digital technologies have lowered search and information costs through the internet and the proliferation of online marketplaces, which provide real-time access to global market information, reducing the effort required to find local suppliers, partners, and customers. On the other hand, advanced information systems such as AI and big data analytics enable companies to process large sets of data and enhance companies' capability to solve complex problems, and hence reducing costs associated with decision-making and problem-solving. The information processing provided by digitalization, therefore, may lead to significant transaction cost saving (Luo, 2022a, p. 356). This is particularly relevant in the context of GVCs, where timely and accurate information is essential for coordination and control. The above-mentioned aspects hint at transaction costs associated with bounded rationality, which not only refers to the costs of collecting and analyzing information, but also indicates that different types of information are available for different agents, in addition to the fact that different agents have limited capabilities to process the collected information and data, meaning that agents may have difficulties in managing complex problems even if the necessary information is accessible (Cuypers et al., 2021, p. 113).

More importantly, the reduction in search and information costs encourages international companies to engage in more transactions with external partners from around the world. The international business landscape has seen a sharp increase in collaborations between different parties around the world. Correspondingly, TCT has accepted the notion of hybrid mechanisms and concentrated on governance modes to manage international interdependencies. Hybrid governance structures, which blend market and hierarchy elements, are increasingly relevant in the digital era. These mechanisms together with digital solutions facilitate collaboration among multiple parties and lower coordination costs associated with transactions by employing routine tasks. Thus, MNCs become capable of implementing and managing complex GVCs, which typically involve a vast number of suppliers and partners (Autio et al., 2021, p. 8).

Furthermore, the need for advanced knowledge in today's highly competitive business environment forces international companies to engage in more and more collaborations with companies capable of providing such knowledge. However, the more complex the technology becomes, a higher level of integration within the company is needed to maximize the benefits of that technology, which in turn indicates the need for more collaborations for complex digital solutions to obtain the necessary network system for the solution to function properly within the company (Chen & Kamal, 2016, p. 564). This is another reason for hybrid mechanisms having received much attention in recent years due to advancements in digital technologies.

In addition to the above-mentioned implications, automated processes provided by digital technologies may also mitigate opportunistic behavior, since humans will be decoupled from the process. To illustrate, blockchain and smart contracts can ensure automatic enforcement of contractual terms and fraud-proof execution of agreements, which eliminate the need for intermediaries, enhance transparency, and reduce governance costs (Hooper & Holtbrügge, 2020, p. 193). This means that such a technology can reduce transaction and governance costs of global supply chains (Schmidt & Wagner, 2019, p. 11) by automating the interactions between international companies and local suppliers, implementing digitalized governance instead of costly managerial control. This is especially crucial for international companies operating in various countries with different regulatory requirements in regard to companies' interactions.

In a broader view, digital technologies minimize internal coordination costs by enhancing information processing, improving decision-making, and increasing the quality of monitoring systems; while they decrease external coordination costs by making market information more accessible, providing improved linkages between companies, and mutual monitoring between trading partners (Chen & Kamal, 2016, p. 566). These are critical factors for international companies, since such companies typically have a vast amount of intra-company and inter-company coordination across borders. The reduction of internal coordination costs helps them increase the efficiency of within-company interactions, while the decrease in external ones can facilitate their internationalization, collaboration with local partners, and the control of global suppliers.

In conclusion, TCT has evolved to address a wide spectrum of organizational and managerial issues, particularly in the context of international business. The theory's application to MNCs provides a framework to understand the complexities of cross-border transactions and especially digital transformation of international companies. The adoption of digital technologies into business processes not only reduces traditional costs, but also enables new forms of governance that are better suited to the interconnected nature of modern global business.

3.1.2 Resource-based View, Knowledge-based View, and Dynamic Capabilities

Similar to TCT, resource-based view (RBV) or theory is considered as one of the most influential theoretical frameworks in management research to explain organizational processes, emphasizing the optimal utilization of a company's internal resources to achieve a sustainable competitive advantage (Cooper et al., 2023, p. 1). Since its inception in the late 1950s and subsequent development by management scholars, the RBV has been used to shed light on a broad range of organizational phenomena, including companies' strategy, mergers and acquisitions, strategic alliances, and more importantly for this dissertation, international business. Since a company's internal resources not only include assets, but also capabilities and competences, several theories and concepts have been emerged from the RBV such as knowledge-based view (KBV) and dynamic capabilities. The KBV is particularly noteworthy because it highlights the importance of knowledge as a strategic resource (Cooper et al., 2023, p. 1), especially in today's highly competitive and dynamic environment.

Cuervo-Cazurra et al. (2018) argue that the development of RBV was a response to the notion that previous theories, especially TCT, were concentrated on transactions and their associated costs, ignoring the fact that transactions are subject to be affected by the attributes of the company engaged in the transaction; hence, RBV attempts to explain how additional value can be obtained by investing in the development of resources and capabilities, which increases competitive advantages of the company (p. 213). This suggests that TCT and RBV may demonstrate two sides of a coin. While TCT is focused on transactions and reducing their costs, RBV provides a framework to increase value through the optimum use of companies' resources.

RBV posits that a company's performance is rooted in its unique "bundles of resources and capabilities", hinting at the relatedness and interdependencies of resources and capabilities in a company (Barney et al., 2021, p. 1939). A resource, in this context, is defined as any strength or weakness of a company and includes tangible or intangible assets such as machinery, capital, brand, technological knowledge, employee skills, etc. (Wernerfelt, 1984, p. 172). According to early studies and reemphasized later, these resources must be valuable, rare, inimitable and non-substitutable (VRIN) in order to provide real advantages (Barney, 1991, p. 112).

The incorporation of RBV into the analysis of MNCs has influenced several internationalization theories. For instance, the previously mentioned incremental internationalization (Johanson & Vahlne, 1977) embraced RBV principles and illustrated how MNCs gradually develop new knowledge by learning from cross-border operations to build effective foreign market entry strategies over time (Cuervo-Cazurra et al., 2018, p. 215).

Indeed, knowledge has the ability to provide sustainable competitive advantage, since it usually is valuable, rare, inimitable, and non-substitutable, which in turn makes it a critical strategic resource for companies to increase their performance in long terms (Pereira & Bamel, 2021, p. 558). This has led to the development of KBV as an expansion of RBV and indicates the importance of knowledge to create value. Regarding international business, KBV considers MNCs as a coordinator or a connector, which collects the knowledge gained or developed from global locations and internalizes it in a centralized process (Nambisan et al., 2019, p. 1476).

Furthermore, the quickly changing environment of business in recent decades forces companies to be agile and respond to changes accordingly. This has led researchers to introduce the concept of dynamic capability (as another extension of RBV), which can be defined as a “firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece et al., 1997, p. 516). This perspective underscores the need for companies to not only possess strategic resources such as knowledge, but also to adapt and create new resources continuously in response to market dynamics. Regarding international business, dynamic capabilities indicate the importance of continuous adaptation and innovation in order to respond to each market’s environment by reconfiguring resources and their international employment (Nambisan et al., 2019, p. 1476).

The advent of the internet has significantly transformed this resource reconfiguration due to the connectivity it provides, facilitating dynamic capabilities of MNCs and making the process of resource management more interdependent (Nambisan et al., 2019, p. 1476). This has provided MNCs with the ability to recognize the location, time, and type of necessary capabilities, thus helping them reshape existing capabilities for international activities (Luo, 2022b, p. 970). Moreover, tangible resources are replaced by intangible ones in the digital era (Parente et al., 2018, p. 59), highlighting the role of knowledge to gain competitive advantage and the capability of KBV and RBV to explain advanced digital technologies as strategic resources for companies (Pereira & Bamel, 2021, p. 558).

In a connected dynamic global business as described above, intangible digital assets are crucial for company’s performance. However, these assets also need to encompass VRIN principles, according to the RBV, to provide competitive advantages. Cuthbertson and Furseth (2022) see the value of digital resources in the ability of continuous updating the data and algorithms, the rarity in different scalability, the inimitability in legally protected data and algorithms, and the non-substitutability in physical barriers such as linking the data to customers’ unique assets

(pp. 171–172). This argument is in line with dynamic capabilities' emphasis on continuous adaptation and innovation (Nambisan et al., 2019, p. 1476), and also the necessity of widespread adoption and trust for competitive advantages in the digital era (Parente et al., 2018, p. 59). The reason for different VRIN attributes in the digital business lies behind the unlikeliness of digital resources to preserve their competitive advantage over time, since they can be obtained by competitors more easily compared to traditional resources, which have been typically tied with people, relationships, and cultures (Cuthbertson & Furseth, 2022, p. 173).

Furthermore, digitalization makes key resources such as technology, expertise, and digital infrastructure more available around the world (Bhandari et al., 2023, p. 2; Nambisan et al., 2019, p. 1465), which decreases the rarity and increases the possibility of imitating developed digital solutions by foreign competitors. In this regard, higher scalability of digital resources may be beneficial for companies to rapidly gain higher market shares in foreign markets and make it costly for local competitors to offer the same digital product. In fact, research shows that incorporated digital resources enable INVs to achieve faster and broader international market penetration (more international sales earlier in their lives from more foreign markets) compared to those relying solely on traditional resources, since digital assets reduce location specificity due to their ease of replication (Autio & Zander, 2016, pp. 3–4). This implies that higher performance in foreign markets is derived from higher adoption of digital resources (Bhandari et al., 2023, p. 14).

Despite the above-mentioned benefits of digital resource adoption, it is crucial for companies to turn these resources into firm-specific assets (FSAs). This can be accomplished by employing company-specific digital resources (Bhandari et al., 2023, p. 2). For instance, the digital data gathered from a market place provider such as Amazon showing who its customers are, what characteristics and preferences they have, and how they interact with offered products and services, is unique to that company and provides competitive advantages. In this regard, more data resources and hence more FSAs are obtained when more foreign markets are covered by the company. This is in line with RBV's interpretation of company's resources pointing at "what a firm has" (Cuthbertson & Furseth, 2022, p. 171).

However, with digital resources more available in the contemporary global economy and the possibility of global competitors accessing the same data by leveraging similar business models, it becomes more critical "what a firm does" with such resources, which likely represents the perspective of the KBV (Cuthbertson & Furseth, 2022, p. 171). In this view, algorithms are considered as a crucial companies' resource, since they are tools to interpret and analyze the

gathered data. As an illustration, the data collected from drivers, travelers, and trips is necessary for Uber to operate, however, it is more important how Uber connects drivers and travelers using advanced algorithms and AI systems. Otherwise, competitors could imitate the business model and collect the same data in local markets, which exactly occurred in China, where DiDi offered the same business model and acquired Uber's business in the country due to Uber's inability to provide FSA in that market. The notion of "what a firm does with digital resources" and the example above demonstrate the importance of developing knowledge and company-specific know-how as strategic resources in the digital era.

Developing such know-how in the digital era requires advanced expertise and highly skilled people. However, not always have companies access to the required expertise internally. This highlights the need for co-specializing and co-creating digital solutions. Indeed, acquiring new capabilities is found to be the key motivation for collaborative interactions with external partners in different stages of creating digital innovation (Fernandes et al., 2022, p. 156). Undoubtedly, there should be a positive difference between this motivation and the results of the interaction or investment for collaborative strategies to be valuable (Barney et al., 2021, p. 1940). This is the reason why so many MNCs are partnering with startups and knowledge-based companies from different locations to co-develop new advanced solutions. In fact, large corporations search for these partnerships due to the lack of internal expertise (Fernandes et al., 2022, pp. 156–157). Since MNCs are typically conducting business in at least several foreign markets and have subsidiaries in those markets, they seek for available expertise in all markets, which is also fostered by digitalization because digital solutions are non-location-bound and can be transferred easily to other markets.

The lack of internal expertise is not the only reason for collaboration, but lack of digital resources also leads companies to search for external partners. For instance, the digital infrastructure of a company, such as cloud capacities, may not be sufficient enough to support the developed digital solutions. Indeed, large corporations are motivated to go through partnerships if the necessary workforce or resources to conduct specific activities are not available internally even if the necessary capability is available (Fernandes et al., 2022, p. 157). This is more in line with the RBV principles rather than those of KBV and emphasizes again the importance of company-specific resources.

While accessing to digital resources are crucial for providing competitive advantages, organizing and internalizing these resources within the company is necessary to enable innovation and facilitate dynamic capabilities in order to have a long-term competitive advantage (Cuthbertson

& Furseth, 2022, p. 174). This is especially critical in case of partnerships because the implementation of provided digital resources or knowledge by external partners requires training and internal expertise (Fernandes et al., 2022, p. 156), since the resources are obtained externally and different subunits within the company are not familiar with them. Moreover, this is another reason for collaboration with external partners to internalize the provided resources and knowledge together with them.

However, this cooperation is associated with transaction costs as described in the last section and not only brings the risk of losing confidential internal capabilities due to opportunism, but also the possibility of becoming dependent on external parties. This becomes more challenging when the transaction occurs between an MNC and a foreign resource or knowledge supplier due to unfamiliarity with different language, culture, and legal framework (see section 3.1.1). Therefore, Fernandes et al. (2022) find that companies usually follow the strategy of developing core capabilities internally while outsourcing non-core operations (p. 156).

Overall, RBV and its extensions, including KBV and dynamic capabilities, provide a robust framework for understanding companies' competitiveness in the modern business landscape. Digitalization and digital resources have further nuanced this framework by highlighting the critical role of intangible resources. This introduces new advantages and challenges for international companies, since intangible resources may reduce location specificity and enable companies to increase their international performance. On the other hand, the contemporary global economy provides a landscape, in which partnerships to acquire the necessary resources and capabilities are fostered.

3.1.3 Internalization Theory and Eclectic Paradigm

TCT and RBV have inspired and influenced several foundational theories in the field of international business research. Internalization theory is one of these theories, which explains why companies expand their operations across national borders by internalizing activities that are more efficiently handled within the company rather than through external market-based mechanisms (Rugman, 2010, p. 3). This was followed by the introduction of the eclectic paradigm, which integrates ownership, location, and internalization advantages (OLI) to explain the determinants of FDI (Rugman, 2010, p. 2). Together, internalization theory and the eclectic paradigm have provided a solid framework to evaluate MNCs and their international activities. Yet, still in the digital era characterized by increasingly connected digitalized processes, they have been frequently used by scholars to analyze and describe companies' cross-border strategies,

business activities, and utilization of advanced technologies. Thus, both theories will be introduced in this section and their relevance for companies' digitalization will be highlighted.

First developed by Buckley and Casson (1976), internalization theory posits that international companies organize their activities internally to develop and exploit FSAs, especially for knowledge and intangible assets, which in turn help companies overcome the externality of knowledge (p. 45). Thus, it links companies' international expansion with the costs and benefits of internalizing foreign markets (Banalieva & Dhanaraj, 2019, p. 1373). The theory embraces the TCT's principles that the internal hierarchy of an MNC is a better approach when market fails to address cross-border transactions efficiently (Narula et al., 2019, p. 1231). In this manner, internalization is an alternative to partnerships in foreign markets for acquiring knowledge and hence, FDI is preferred in this theory to other market entry modes such as alliances or licensing (Rugman, 2010, p. 2). The reason lies in the fact that FDI provides comprehensive control and governance over the company's FSAs in local markets.

In other words, internalization theory provides an explanation for MNCs' preference to have exclusive control over intangible assets, specifically knowledge-based FSAs (Buckley & Casson, 1976, p. 56). The knowledge gained through external partners in foreign markets is typically associated with high transaction costs due to opportunism and bounded rationality described in section 3.1.1. Therefore, the ownership and organization of knowledge and resources within a company ensures the efficient management of cross-border activities and prevents loss of competitive advantages derived from the knowledge.

According to Cuervo-Cazurra et al. (2018), sustainable competitive advantage cannot be achieved by externally obtained knowledge, since the same external knowledge can be obtained by competitors; this is likely due to the nature of knowledge, which is often not rivalrous, excludable, or codifiable, meaning that the use of knowledge by one company does not automatically or easily prevent other companies to use the same knowledge, therefore, companies may need to keep it in-house rather than relying on external partners (p. 213).

FSAs are the core concept in developing the internalization theory (Banalieva & Dhanaraj, 2019, p. 1374). The international business research distinguishes between two types of FSA, namely non-location-bound and location-bound FSAs. Non-location-bound FSAs can be transferred across national borders with low costs and efforts (e.g., developed knowledge in one country), whereas location-bound FSAs are specific to one or several particular locations (e.g., market knowledge) (Drori et al., 2024, p. 5).

Furthermore, FSAs not only include knowledge, but also brand, management skills, organizational capabilities, etc. This is in line with RBV, which as described before stresses the importance of such internal resources to develop competitive advantage. Internalization theory utilizes then both TCT and RBV to explain how MNCs can manage their FSAs in foreign markets efficiently (Rugman, 2010, p. 3). This also applies to the digital business world, where international companies are deploying more and more digital resources while digitalized processes are reducing transaction costs.

In this regard, digital resources are known to be far less location-bound while digital technologies can also mitigate location-boundedness of non-digital resources, since digitalization enables companies to reduce communication costs, exploit knowledge more effectively, and transfer FSAs across borders more easily (Drori et al., 2024, p. 5). However, the higher transferability of digitalized FSAs may increase the risk of imitation. Sustainable competitive advantage results from VRIN FSAs together with broadening the access to those FSAs across national borders. Since digitalization has the ability to make FSAs non-location-bound and more easily transferable, geographic borders lose their role as a barrier against availability of knowledge and hence, more competitors can copy the knowledge (Banalieva & Dhanaraj, 2019, p. 1377).

As demonstrated before, transaction costs are very high when companies and suppliers from two countries are engaged in a trade, especially for intangible assets such as know-how due to the necessary negotiation, monitoring, and enforcement. More specifically, information asymmetry is often a possibility and inevitable in such cases (Narula et al., 2019, p. 1232). Digital technologies can also help mitigate information asymmetry by increasing the availability of information, and reduce costs by increasing the transferability of acquired knowledge (Drori et al., 2024, p. 18). This means digital technologies enable international companies to apply hybrid mechanisms in order to first, gain the desired knowledge and know-how through partnerships (market-based mechanism) and then internalize the obtained knowledge within the company's global network (hierarchical mechanism). In both cases, digital technologies help reduce transaction costs due to greater information availability and also reducing the location-boundedness of knowledge, which in turn makes its internalization more efficient.

Furthermore, digital technologies can enhance knowledge recombination in MNCs. Digital connectivity allows companies to merge foreign location advantages in terms of knowledge creation with governance modes in an adaptive way (Luo, 2022b, p. 972). This capability enables MNCs to engage in partnerships with foreign suppliers, co-create knowledge with them, and integrate the knowledge into own GVC by deploying digital governance. This means MNCs

can co-create their FSAs in local markets and have centralized control over the process without the risk of losing competitive advantage in the host country.

It was previously mentioned that born digitals and knowledge-based companies typically do not engage in FDI and are less likely to have foreign subsidiaries similar to traditional MNCs. For these companies, Banalieva and Dhanaraj (2019) suggest that FSAs can be divided into technology (technological advancements) and human capital (employees' skill and knowledge). They argue that it is difficult to decouple highly tacit knowledge from human capitals who have such knowledge and skill. In this regard, digital technologies may support internalization of knowledge by increasing the efficiency in hiring, training, and communicating. On the other hand, technology-based FSAs can be internalized and governed by innovative and connected solutions (p. 1375). Indeed, companies with lower levels of innovation are less capable of exploiting digitalization's ability to reduce transaction costs associated with market-based mechanisms in order to expand their activities across borders (Drori et al., 2024, p. 18). These arguments suggest that digital companies can facilitate the governance of technology-based FSAs by connected digital tools. However, internalization of highly tacit knowledge tied with human capitals (such as high-skilled programmers) still need to be done through traditional ways.

Overall, internalization theory still provides a robust framework to explain increasingly digitalized business processes and how FSAs can be enhanced by digital technologies to bring competitive advantages in local markets.

Dunning's (1980) eclectic paradigm, also known as OLI paradigm, builds on internalization theory by incorporating OLI advantages, which describe MNCs' international activities (p. 9). Ownership advantages are synonymous with FSAs and represent companies' proprietary assets, especially non-location-bound intangible assets such as technology or managerial expertise, which provide competitive advantages in foreign markets; location advantages are synonymous with country-specific assets and pertain to the specific benefits of operating in particular geographical areas when desired location-bound resources for the company are located in a host country rather than at home, hinting at the importance of location choice; internalization advantages are mirrored by the internalization theory and concern companies' ability to manage cross-border activities internally rather than through the market (Narula et al., 2019, p. 1234). This implies that the eclectic paradigm also embraces the principles of TCT, RBV, and dynamic capabilities, since OLI advantages can be understood as control over resources, benefits of foreign market presence, and control over cross-border relationships respectively (Cuervo-Cazurra et al., 2018, p. 215).

In short, the eclectic paradigm demonstrates that MNCs develop competitive ownership advantages at home, transfer these to specific countries where they can exploit location advantages through FDI, which in turn enables MNCs to internalize the ownership advantages (Rugman, 2010, p. 2). Therefore, there is strong linkage between the three factors, whereby ownership advantages are deployed in conjunction with location advantages in foreign markets, and internalization advantages determine to which extent the interdependencies associated with the last two advantages are organized within an MNC.

The eclectic paradigm has been instrumental in international business research to explain MNCs' characteristics. However, digitalization has introduced a new environment for international business, which requires even greater adaptation of MNCs' capabilities to remain competitive in international markets. Accordingly, OLI advantages need to be re-assessed in order to be able to describe new digitalized business processes.

Regarding ownership advantages, a globalized economy provides a dynamic and connected environment for innovation (Alcácer et al., 2016, p. 505). In such an environment, sustainable competitive advantage requires not only exclusive control over key assets and capabilities, but also continuous updating of these capabilities (Luo, 2021, p. 3). Moreover, more complex and modularized digital technologies, as companies' key capabilities, result in focusing on specific parts of a value chain (Alcácer et al., 2016, p. 505). As the demonstrated implications in table 2 suggest (section 2.2.2), digital technologies may alter MNCs' strategies to own and control particular value chain activities (Strange & Zucchella, 2017, p. 180). These arguments highlight the need for new ownership advantages, which encompass information and knowledge integration across borders and also inter-company and intra-company boundaries (Alcácer et al., 2016, p. 505). Thus, digital ownership advantages represent more easily and internationally applicable intangible assets (Parente et al., 2018, p. 57).

Therefore, a network-based ownership advantage emerged from highly digitalized and connected business environment should enable cross-sharing of key resources (Banalieva & Dhanaraj, 2019, p. 1374). Such open resource advantage provides synergetic benefits from collaboration between subunits of a company or between companies in an industry (Luo, 2021, p. 3). Although this sharing mitigates the rarity of key resources, the innovative use of the resources bundled with the company's existing knowledge creates sustainable competitive advantages (Luo, 2021, p. 3). This is in line with the previously discussed argument that "what a firm does" is now more crucial in the digital era than "what a firm has" as resources.

Regarding location advantages, location-bound resources such as low-cost labor or scarce raw materials have traditionally led MNCs to establish FDI in specific foreign countries. However, contemporary GVCs and greater integration of digital technologies shift the motivations for location choices from traditional factors to new ones (Luo, 2021, p. 3). For instance, robotic systems have the potential to reduce cost incentives associated with low labor cost countries, as shown in table 2. On the other hand, location choices based on where the final customer is rather than where low-cost resources reside, seem to be increasingly the central debate in digital globalization (Strange & Zucchella, 2017, p. 180). Furthermore, local clusters and connectivity between locations have been paid attention in recent years, suggesting that global acquirement of knowledge is an important element of new location advantages (Alcácer et al., 2016, p. 502).

This connectivity is characterized with easier knowledge flows and a close inter-company linkage. A new linkage advantage emerged from connected global business environment enables MNCs and their subsidiaries located in different countries to cooperate and share various resources, reducing specific advantages related to different locations (Luo, 2021, p. 4).

Regarding internalization advantages, external resources and capabilities are more available in a connected international business landscape, leading companies to be in active search of these resources (Luo, 2021, p. 3). Externalizing resources and operations need a greater effort to internalize them, by which companies can exploit internalization advantages (Strange & Zucchella, 2017, p. 180). This suggest that internalization advantages should be greater in regard to both internal and external operations, since the company is more engaged in external operations, which need to be orchestrated with the network of the company (Alcácer et al., 2016, p. 507).

The orchestration of internal and external operations within a company's global network implies a high level of integration between the MNC on one hand and its partners and suppliers on the other hand. Therefore, an integration advantage emerged from a highly connected GVC improves coordination and enhances companies' internalization advantages in the digital era (Luo, 2021, p. 4).

Overall, OLI advantages remain to be an important tool to describe companies' international activities, while new interpretations of these advantages complement the traditional ones. In the digital era, ownership advantages are derived from diverse sources concentrating on co-creation and cooperation with external partners, while location advantages are more of one location's

ability to connect to other locations around the world. Finally, internalization advantages are related to a company's ability to orchestrate GVC activities within the network of the company.

To summarize, the evolution of internalization theory and the eclectic paradigm still provides a comprehensive framework for understanding MNCs' behavior and strategies in foreign markets. In this regard, digitalization-related capabilities and knowledge created in host countries need to be internalized. Moreover, OLI advantages may seem different due to digital connectivity and digital assets, but they are still important factors of the decision on establishing FDI in foreign countries.

3.1.4 Digital Ecosystems and Platforms: A Shift from Internalization to Value Co-creation

As discussed in previous sections, digitalization of business processes has had considerable impacts on established theories of MNCs. In this regard, a relatively new phenomenon emerged from the intensive employment of digital technologies and the core concept of connectedness in the digital era, has been paid much attention in the international business literature in recent years, known as digital ecosystems and platforms. These ecosystems highlight the interconnectedness and interdependence of various actors including companies, suppliers, and customers. They have introduced new ways of value creation, by which value is not created solely through the international company, but rather in interaction with stakeholders¹. This has the potential to change companies' internationalization and how they organize and coordinate their cross-border operations, which will be discussed further in this section.

The term "ecosystem" comes from biology and can be defined as "the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialize", whereby alignment refers to members' goals and activities, and multilateral to not only a multiplicity of partners, but also a set of relationships that cannot be leveled down to bilateral interactions (Adner, 2017, p. 42). This definition refers to business ecosystems and is understood as an economic community of interacting stakeholders that all have influence on each other through their activities (Jacobides et al., 2018, p. 2257). Silicon Valley is a useful example of such ecosystems, representing a community of companies interacting with and influencing each other.

¹ In this dissertation, the term "stakeholder" refers to groups or individuals that may have interests in and (direct) connections to specific products or business projects. These include managers, employees, customers, and suppliers. This understanding can deviate from the traditional stakeholder theory's definition, whereby "any group and individual who can affect or is affected by the achievement of the organization's objectives" should be taken into account (Freeman, 2010, p. 46), meaning that the traditional definition encompasses owners, shareholders, and governments as well, which are not addressed in this dissertation when using the term.

However, ecosystems can also be focused on an individual company. These are commonly known as platform-centric ecosystems (or digital platforms), which construct a “hub and spoke” form, with peripheral participants (suppliers, distributors, customers, competitors, ...) “connected to the central platform via shared or open-source technologies and/or technical standards” (Jacobides et al., 2018, p. 2258). The platform owner/broker has the hub position in the network and maintains power through centrality (Adner, 2017, p. 50). Uber and Airbnb are well-known examples of such platforms, which both connect peripheral companies or suppliers to customers. They have a modular architecture that enables multilateral interactions among members of the platform (Li et al., 2019, p. 1448).

Digital platforms are increasingly being paid attention, not only by digital companies, but also by MNCs. In this regard, Li et al. (2022) examined the overall time and effort spent by MNCs to create and organize digital platforms and called the phenomenon “digital platform attention”. By exploring the impacts of three distinct dimensions (intensity, persistence, and scope), they concluded that more intensive and persistent digital platform attention is more effective in reaching global customers and achieving better international sales (Li et al., 2022, p. 1831). This highlights the importance of digital platforms as a digital tool for international companies to facilitate their international expansion.

The advent of digital platforms has stressed the concept of value co-creation, which can be understood as direct collaborative interactions of platform participants with the aim of contributing to the value jointly created for one or both participants (Grönroos, 2012, p. 1520). For international companies, this means that co-creating, co-specializing, co-learning, and co-locating enable them to merge FSAs and country-specific assets at the collective level for all participants (Nambisan et al., 2019, p. 1471).

By connecting to the platform, complementors can complement the product or service of another complementor by adding value to mutual customers (Jacobides et al., 2018, p. 2258). Unquestionably, they are embedded in the concept of digital platforms and are necessary for their development. However, it is difficult in international markets to collect and access complementary resources and suppliers (Verbeke & Hutzschenreuter, 2021, p. 612). National borders, different cultures, business environments, and legal frameworks make it difficult to embed complementors to the digital platform. Moreover, complementors usually pursue their own economic goals, which in foreign markets may vary significantly compared to the home market.

This highlights the importance of network effects, which is another specific characteristic of digital platforms. A platform exhibits positive network effects, as more customer participate in the network, thus, network effects can be understood as economies of scale in demand side (Li et al., 2019, p. 1450). Greater network effects by a larger pool of customers attract more complementors, which in turn results in higher attractiveness for customers (Li et al., 2019, p. 1450; Verbeke & Hutzschenreuter, 2021, p. 610). This leads to a more valuable platform for each participant including both individual customers due to higher level of interactions, and individual complementors due to higher profits emerged from more customers (Verbeke & Hutzschenreuter, 2021, p. 610).

Although interactions are conducted digitally in such platforms hinting at non-location-boundedness of the interactions, network effects can demonstrate location-boundedness, especially when transactions are connected to physical components. For instance, Airbnb service is tied with houses in specific locations, hence, landlords and tenants need to be co-located in its service, making the network effects location-bound (Li et al., 2019, p. 1451).

Similarly, Stallkamp and Schotter (2021) outlined the difference between within-country and cross-country network effects, whereby cross-country network effects are associated with non-location-bound FSAs and involve customers of different countries (p. 65). This is different than the location-boundedness of interactions described above. In the above-mentioned example, Airbnb has a unique interface and algorithm as its FSA, which can be easily transferred across borders. Customers of one country can book a house in one another country via Airbnb's platform. However, for the final interaction to be occurred, both customers and complementors in Airbnb's platform need to be in one specific location. On the other hand, companies such as food delivery platforms represent within-country network effects with location-bound FSAs, since such platforms typically involve customers in a single country.

The above-mentioned explanations and examples mostly illustrated business-to-customer applications. However, digital platforms can also be applied for business-to-business purposes, including companies from different industries, or within an individual company to connect and coordinate its supply chain activities. In fact, digital platforms are increasingly implemented for such purposes to connect buyers and sellers in business-to-business markets (Shree et al., 2021, p. 354). For MNCs, this represents an opportunity to reorganize and coordinate their international business activities through cooperation and collaboration with suppliers in different locations. There are various internal digital platforms, which can be employed in MNCs. For instance, new iterations of enterprise resource planning (ERP) systems can also be considered

as a digital platform, since it connects all components of supply chain and enable stakeholders to not only share information, but also have access to shared information within the network of the MNC.

Such platforms, embedded internally within an international company, differ from companies' networks of global supply chains, which traditionally are explained by network theory. In supply chain networks, the hub company separates its partners and suppliers from each other to increase its own network advantages, whereas exchanges and interactions among partners and suppliers are fostered in platform structures (Li et al., 2019, p. 1452). The absence of such interconnectedness eliminates platform advantages, demonstrating a typical supply chain network with the hub company as the distributor (Adner, 2017, p. 50).

Furthermore, MNCs can benefit from deploying digital platforms because these platforms enable both internalization and externalization (hybrid mechanisms) (Pitelis & Teece, 2018, p. 533). Internal partners and their knowledge can be easily integrated in the MNC's network while external partners and outsourced knowledge can receive certain access to the platform through predefined rules. This ensures the collaboration between stakeholders and at the same time, stresses the importance of governance in digital platforms to avoid loss of knowledge.

Indeed, governance is one commonly discussed aspect of digital platforms, since these platforms as a digital technology, enable new ways of controlling and coordinating international interactions, which have been traditionally explained by TCT and internalization theory as described in previous sections. However, platform-based interactions may not be sufficiently assessed by these theories due to their unique characteristics.

Internalization theory suggests a vertically integrated structure to exploit FSAs and govern cross-border markets (Li et al., 2019, p. 1449). This main concept devalues the role of inter-company cooperation, which is an increasingly important factor in the contemporary international digitalized business (Pitelis & Teece, 2018, p. 528). Moreover, internalization theory emphasizes the ownership of intangible assets and FSAs to overcome liabilities of foreignness (Li et al., 2019, p. 1451). Digital platforms, however, give access to external local companies and partners. They provide a structure, in which foreign companies as complementors can be coordinated without the need for extensive hierarchical governance, giving complementors a degree of freedom in decision-making while relying on platform's standards (stemming from digitalization) for governance mechanisms (Jacobides et al., 2018, p. 2263).

TCT also does not provide sufficient explanation for the governance of digital platforms. Although it recognizes the co-existence of market and hierarchy, the unique characteristics of platform-based cooperations do not fit with its main principles (Pitelis & Teece, 2018, p. 528). In contrast to TCT, transactions in digital platforms are associated with the level of participants' roles, which are standardized for each role in the platform (Jacobides et al., 2018, p. 2265).

The modularity provided by digital platforms enables international companies to transfer their technology-based FSAs across borders and bundle them with local companies' FSAs (Banalieva & Dhanaraj, 2019, p. 1377). The risk of bounded rationality emerged from this international cooperation can be reduced by assigning the production of localized product or service to local complementors (Li et al., 2019, p. 1450).

Furthermore, platform advantages often stem from rejoining intangible assets with tangible ones or digital assets with non-digital ones. This highlights the need for hybrid governance structures, including market-based contractual rules and the internalization of complementary resources (Verbeke & Hutzschenreuter, 2021, p. 613).

The need for specific governance mechanisms for digital platforms has led scholars to introduce new theories and concepts. In this regard, Li et al. (2019) have proposed ecosystem-specific advantage, which comprises three components including heterogenous resources contributed by participants, cooperation among participants, and finally governance (Li et al., 2019, p. 1455). In this regard, governance does not stem from market-based contractual rules, but rather from the platform's network rules, including payment system and terms of use (Verbeke & Hutzschenreuter, 2021, p. 609).

Similarly, Banalieva and Dhanaraj (2019) suggest network-based ownership advantages and consider them as separated from traditional asset-based and transaction-based ownership advantages. They argue that network advantages demonstrate different location boundedness and isolating mechanisms, and are more efficient than hierarchy due to the standardization provided by digital network rules (p. 1380).

These suggest that digitalization enables the creation of new governance tools, which are non-location-bound due to the ability of digital technologies in remote monitoring (Verbeke & Hutzschenreuter, 2021, p. 610). For MNCs, this means that foreign partners and suppliers can be easily monitored and the MNC does not necessarily need to own all important assets and knowledge. However, cross-border digital network governance is faced with challenges. For instance, acquiring patent rights for digital assets in different countries is still challenging, thus,

familiarity with local markets and ownership of key assets are crucial for MNCs to overcome the challenges (Verbeke & Hutzschenreuter, 2021, p. 612).

Regarding complementary resources, another component of ecosystem-specific advantages and a critical element in digital platforms, the networked sharing of resources suggests that the resource capacity of companies are not restricted by their internal resources, but rather by the networks (digital platforms), in which they are participating (Cuthbertson & Furseth, 2022, p. 170). This demonstrates a change in MNCs' attention from acquiring internal assets to managing platform-level resources in order to bring competitive advantages in foreign markets (Zeng, 2022, p. 1), hinting at a shift from resource ownership to resource orchestration (Nambisan et al., 2019, p. 1471).

Resource orchestration is closely tied with the concept of dynamic capabilities of MNCs and can be defined as “the ability to combine selected technologies, individuals, and other resources in new products and processes regardless of location and across organizational boundaries” (Lessard et al., 2016, p. 214). Orchestrated resources can be intangible or physical assets (Pitelis & Teece, 2018, p. 530). This in line with the ability of digital platforms, by which tangible and intangible assets can be combined. Indeed, the exploitation of ecosystem-specific advantages often necessitates the joining of digital assets with co-specialized non-digital ones (Verbeke & Hutzschenreuter, 2021, p. 613). As an illustration, drivers, riders, and automobiles in different locations are all combined with and connected to unique algorithms, payment systems, and digital solutions through Uber's platform, as are landlords, tenants, and houses in Airbnb's platform with digital assets.

In the same manner, internal digital platforms of MNCs often combine digital and non-digital assets. For instance, an ERP system connects different locations and manufacturing sites to developed software, databases, or digital twins. Hence, MNCs are also becoming “digitally networked orchestrators” of their foreign subsidiaries as well as their foreign partners (Banalieva & Dhanaraj, 2019, p. 1384). In line with this view, Bhandari et al. (2023) note that digital resources comprise company-specific digital resources, digital network resources, and digital synchronization capabilities. They argue that connectivity makes global resources more available, however, they should be converted to FSAs for competitive advantages; and network resources will be converted to FSAs by developing synchronization (orchestration) capabilities, which is possible by applying digital technologies (pp. 2–3).

In this view, company-specific digital resources and FSAs mostly refer to the digital platform and its algorithm as a digital technology. This, however, increases the risk of cross-border mis-usage or imitation due to the openness of the platform for foreign companies and competitors (Nambisan & Luo, 2021, p. 1650). The risk will be further increased when standard digital components are implemented in the platform (Banalieva & Dhanaraj, 2019, p. 1377). Therefore, international companies should ensure that their core system and algorithm are non-imitable to provide a strong and competitive FSA in foreign markets. Moreover, they should carefully consider, which part of the digital platform is accessible to minimize the risks.

Nevertheless, the openness of digital platforms fosters ecosystem-specific advantages through the positive dependencies between the MNC and its partners, whereby a greater openness leads to a larger number of foreign partners, and hence the opportunity to better adapt the joint value creation to local needs (Nambisan & Luo, 2021, p. 1649). This effect can be further enhanced by cross-country network externalities, often resulting in hub MNCs taking the role of winner-takes-all, which is unlikely by within-country network externalities (Stallkamp & Schotter, 2021, p. 72). The dominant position in the platform also enables the hub company to enter into new industries with established MNCs and hence, further increasing value creation for customers and becoming global superpowers (Verbeke & Hutzschenreuter, 2021, p. 611).

In conclusion, the evolution of digital platforms underscores the transformative impact of digitalization on business value creation. By fostering interconnected networks of companies, suppliers, and customers, these platforms are not only able to provide sustained international growth, but also improving the organization and coordination of existing cross-border activities within the MNC's network.

3.1.5 Digital Human Capital: The Rise of Digital Nomadism and Digital Work

The development and employment of digital technologies often requires digital expertise, hinting at the need for high-skilled information technology (IT) professionals. This is especially crucial, since digital technologies are becoming more advanced and companies are deploying more complex digital solutions. Thus, the ability to attract, develop, and retain digital human capital has become a critical determinant of competitive advantage. In this matter, digital human capital is defined as skills and capabilities of employees to develop digital technologies and solutions such as AI, big data, or generally software coding (Grimpe et al., 2023, p. 657).

The necessity of developing such human capital poses both opportunities and challenges for MNCs. On the one hand, the MNCs' global presence enables them to benefit from a global pool

of talent and have access to multiple labor markets; on the other hand, talent strategies should be adapted to the dynamic global context (Collings et al., 2019, p. 541). Moreover, MNCs have to compete with global and local companies regarding talent acquisition. Therefore, MNCs cannot rely only on their global network to acquire digital expertise, but need to establish robust strategies to increase their attractiveness as an employer.

The need for attracting IT professionals is critical due to their shortage in global markets, partly because digitalization's effects extend beyond a single industry, offering enhanced efficiency and product differentiation across manufacturing, financial services, or the public sector (Grimpe et al., 2023, p. 660). This widespread employment of digital technologies further intensifies the competition for acquiring digital talents among companies across industries, and hence increases the demand for such talents. The high demand and lower supply, resulted in the shortage of digital human capital in many host countries, highlights the importance of MNCs' talent acquisition strategies in the digital era.

The above-mentioned aspects raise the question of how MNCs develop and leverage digital talent to generate and integrate relevant knowledge. A unique characteristic of MNCs is that they typically have a geographically dispersed and culturally differentiated workforce around the world. This indicates the need for an efficient global talent management, not only regarding acquiring new talents, but also regarding developing, training, and integrating culturally differentiated digital human capital.

An effective global talent management involves a complex array of practices aimed at managing talent across multiple locations, addressing cultural, institutional, and regulatory diversity. The primary objective of global talent management is to ensure the availability of critical talent in key positions, the identification of global talent pools, and the creation of human resource architectures tailored to specific strategic needs (Collings et al., 2019, p. 543).

By identification and integration of global talents, MNCs need to consider new types of IT workers, who have embraced remote working and comprise a great number in the global talent pool. More specifically, digital nomads are to mention, who are often employed in technology-based positions with the capability of developing digital solutions (Thompson, 2019, p. 27), although a broader view of the digital nomadism includes business owners as well (Cook, 2023, p. 259). The main concept of digital nomadism, however, hints at a different lifestyle, by which specific leisure activities are possible due to a highly mobile working.

Digital nomads adopt remote working by applying digital technologies, which not only makes simultaneous working and traveling possible, but also gives them the autonomy over location choice (Cook, 2023, p. 259). This means digital nomads are a category of mobile high-skilled employees, who can work from anywhere, making their work non-location-bound.

However, there are specific locations known for being of digital nomads' interest. Digital nomads are believed to be tied with their lifestyle and hence specific leisure interests, such as beach and surfing, mountain climbing, or snowboarding (Thompson, 2019, p. 29). Therefore, locations like Spain with such leisure possibilities should be of their interest. This might explain why several related events for digital nomads have been conducted in Spain, where researchers chose as the place to find them (Thompson, 2019, p. 28). Moreover, digital nomads are heavily dependent on digital technologies for their work. This implies that they have to choose locations, in which their technologies are accessible and have proper function (Nash et al., 2021, p. 273). This is another reason for countries such as Spain to be of digital nomads' interest due to their digital technology affordance. For developing digital human capital, this is relevant for MNCs and their subsidiaries. To acquire such digital talents, they need to put emphasis on specific locations, which provide the necessary requirements for digital nomads and their lifestyle. This may involve increasing their brand awareness as a digital-nomad-friendly employer or as far as establishing subunits in such locations.

Retaining digital human capital is another important part of an effective global talent management. In this regard, learning opportunities is an important incentive to prevent IT employees from leaving (Grimpe et al., 2023, p. 678). This is also true for digital nomads, since they typically emphasize the value of socialization work and sharing their knowledge and capabilities (Nash et al., 2021, pp. 272–273). MNCs could create internal virtual collaboration platforms and invest in programs and tools facilitating knowledge transfer among locations and dispersed employees. In this way, all IT employees of an MNC, including digital nomads, would have the opportunity to share information without the need to be in specific locations.

Furthermore, digital technology affordance of subsidiaries is crucial for both digital nomads and IT employees. Such an affordance not only provides learning opportunities (Grimpe et al., 2023, p. 662), but also is considered as a strong incentive. The reason lies in the fact that IT employees tend to accept lower wages in the case of accessing to the latest digital technologies (Tambe et al., 2020, p. 3012). This means new technological systems are more likely to attract

IT professionals than monetary incentives. Thus, investing in foreign subsidiaries' digitalization and providing a higher degree of digital environment in working spaces appear to be an important factor for digital talent acquisition in the digital era.

Indeed, such investments and approaches seem necessary because digital human capital is of strategic importance and associated with the principles of RBV (Grimpe et al., 2023, p. 659). Unique skills and abilities of employees in developing rare and inimitable digital solutions can serve as a source of sustained competitive advantage, which is highlighted by the RBV. Moreover, MNCs need more dynamic capabilities in the contemporary fluid global context to adapt accordingly. In this regard, a successful global talent management enables MNCs' creative response by rearranging human capital's knowledge and digital expertise (Collings et al., 2019, pp. 544–546). This connection with the RBV and dynamic capabilities, once again, implies the strategic importance of developing, training, and retaining digital human capital. In this way, MNCs could create more advanced digital solutions and remain competitive in global markets.

In general, effective talent acquisition and management are vital for MNCs, striving to maintain a competitive edge in the digital era. By strategically developing digital talent, adapting to diverse global conditions accordingly, and leveraging digital nomads and understanding their unique needs, MNCs can enhance the development of advanced digital solutions. Moreover, creating a dynamic and innovative IT community by providing learning opportunities together with integrating and connecting their dispersed workforce appear to be essential in order to benefit from digital expertise.

3.1.6 Globalization vs. Localization: The Question of Standardization or Adaptation

Already internationalized companies and also those in the middle of internationalization process face with the question of whether they should adapt their products, services, and business processes to fulfill host countries' specific needs or offer the same business in foreign markets to benefit from economies of scale advantages. In this regard, the paradigm of global integration and local responsiveness represents a fundamental tension in international business strategy. This framework underscores the dual imperatives of: The need to achieve efficiency through standardized practices (global integration) on the one hand, and tailoring strategies to fit distinct local markets on the other hand (local responsiveness). Digital technologies have the ability to influence this tension providing international companies with more flexibility while choosing the right balance between the two sides.

Advancement in technology, lower transportation and communication cost, lower trade barriers, liberalization of financial policies, industrialization in developing countries, market and competitive factors are seen as the main drivers of globalization (Naz & Ahmad, 2018, pp. 136–137). Levitt's (1983) seminal work posited that these globalization trends would cause similarities and convergence in markets and customers' tastes, leading to a homogenous global market, in which standardized products are offered in all host countries. He argued that standardized products and processes enable companies to benefit from significant economies of scale advantages, cost efficiency, and consistency in brand image (pp. 93–100).

However, the concept of homogenized global markets has not been fully realized, since current global markets still present meaningful differences in economy, politics, infrastructure, culture, and customers' preferences (Mandler et al., 2021, p. 416), making adaptation to local conditions crucial for international companies. Such local conditions are derived from host country (country economic environment, government policy, culture and language barriers), industry (intense competition and suppliers' network), company (previous experience and resource availability), and market (customers' needs and preferences) characteristics (Petison & Johri, 2008, pp. 1403–1409). Although cost reduction through standardization enables higher financial benefits for companies, a better exploitation of differences in foreign markets brings higher profits by providing higher competitive advantages.

Global integration deals with the coordination of cross-border activities in order to create an efficient network of operations and capitalize on similarities across locations (Luo, 2001, p. 451). This refers to the degree of interdependencies within an international company and between its various units and operations, highlighting the importance of global efficiency (Sambharya et al., 2005, p. 145). Local responsiveness, on the other hand, deals with specific needs in host countries' markets (Luo, 2001, p. 452), and the extent of foreign subsidiaries' respond to these differences (Sambharya et al., 2005, p. 145).

The strategic responses to these dual pressures are demonstrated in the typologies developed by Prahalad and Doz (1987) and Bartlett and Ghoshal (1989), shown in figure 2. Companies may adopt global strategy to connect cross-border activities and reduce costs by leveraging global scale; multidomestic strategy to respond strategically to specific demands of each market, often resulting in higher costs but potentially greater market penetration; or transnational strategy to acknowledge both pressures simultaneously (Luo, 2001, p. 453), allowing companies to capitalize on global opportunities while remaining sensitive to local market dynamics.

International strategy is mostly ignored in the literature, since it mainly suits small companies, which are at the beginning of their internationalizing process.

Furthermore, by choosing between these strategies, an international company may adapt its products and processes not to individual host countries, but to an array of host countries. This mostly represents specific regions such as Europe, North America, etc. The markets within these regions typically share similar needs, which allow companies to standardize their products and services in the region. The regional strategy can be seen as a middle approach between global and transnational strategies or between multidomestic and transnational strategies (Verbeke & Asmussen, 2016, pp. 1060–1068).

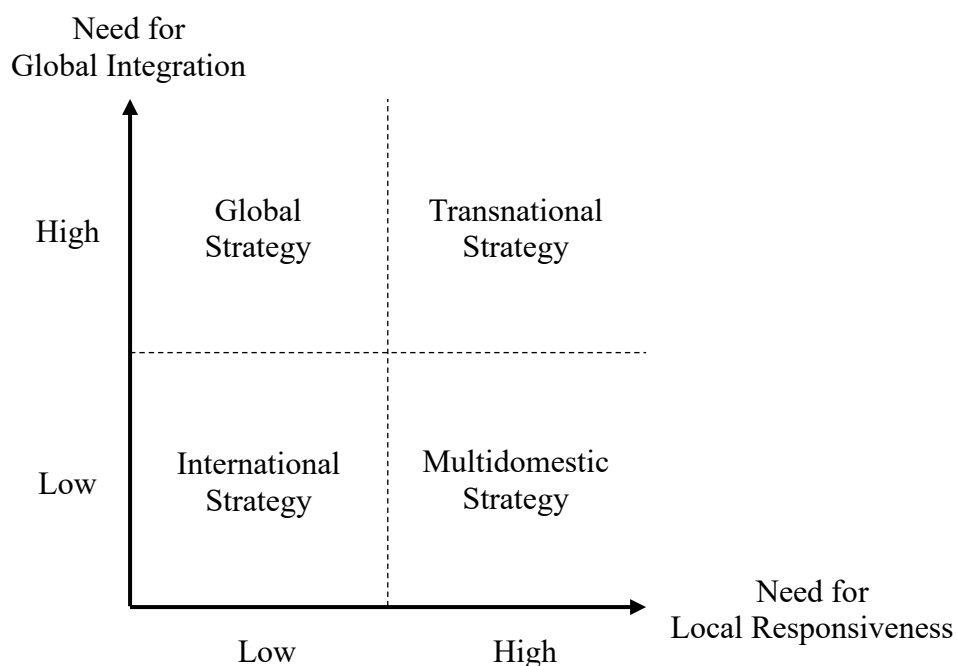


Figure 2: The Global Integration-Local Responsiveness Framework

The impact of digitalization on the globalization-localization paradigm, and hence the balance between standardization and adaptation, is multifold. To begin with, digital technologies increase the possibility of standardization in infrastructures and value chain processes. Moreover, digitalization connects societies and markets, determining a network society, by which social, cultural, and economical relations are less restricted by time and spatial location (Naz & Ahmad, 2018, pp. 137–138). Therefore, digital companies and products may not need such local adaptation, especially due to contemporary similarities in global markets (Verbeke & Hutzschenreuter, 2021, pp. 610–611).

Indeed, Tippmann et al. (2023) show that most international companies offering solely digital products adopt the global strategy and avoid local responsiveness. This is done through replication of new identified innovations by these companies in host countries, and this is despite the fact that digital products and services can be easily altered according to local markets (p. 763). The reason likely lies behind the logic of efficiency and cost reduction provided by the global strategy because even though digital products can be easily adapted, such modifications still increase costs due to software developer wages or higher transaction costs.

On the other hand, however, Vadana et al. (2020) suggest that in order to be successful in foreign markets and demonstrate higher international performance, digital products also need to be adapted locally (p. 480), especially that customers' preferences have changed and gone towards more personalized products and services. Digital technologies allow such hybrid fulfillment of both globalization and localization pressures. For instance, many MNCs are involved in digital platforms, which provide standardization and scale while allow the participating MNC to offer its own local responsiveness (Nambisan et al., 2019, p. 1478). Platform companies themselves may choose the global strategy and attract customers from many foreign markets, or focus on individual markets in fragmented and less globalized industries (Li et al., 2019, p. 1459). Digital platforms that adopt the global strategy then relegate some local responses to complementors. This changes the focus of the global integration-local responsiveness paradigm from parent-subsidiaries to the company's global ecosystem (Nambisan et al., 2019, p. 1475).

The next aspect of digitalization's impact on the paradigm relates to adopting suitable strategies for functions and subfunctions. A critical point is that the framework of global integration-local responsiveness can be used at the aggregate level of industries, companies, functions, and subfunctions (Ghoshal, 1987, p. 429). For instance, an international company may adopt the global strategy for its production as a functional area and integrate its production processes globally while adopting the multidomestic strategy for its marketing and offer its product with different pricing approaches in different foreign markets. Moreover, the brand of the product might be the same in global markets while pricing is different, hinting at the possibility of adopting different strategies at the subfunction level. This implies that the integration-responsiveness balance refers to all international activities of companies at different levels.

In this regard, the connectivity emerged from employing digital technologies, such as the internet and cloud, has several impacts on the integration-responsiveness balance. First, real-time and detailed access to information leads to more educated global customers while allowing customization of marketing strategies for individual markets and market segments (Sambharya

et al., 2005, p. 150). As an illustration, brand has traditionally been considered as a location-bound asset. However, the connectivity and available information enable an increase in both reach and effectiveness of the brand communications. Now, customers located in global markets can be educated more intensely about companies and their brands (Drori et al., 2024, p. 7). Moreover, international companies also have the possibility to obtain direct and instant feedback from customers about their products and marketing practices (Sambharya et al., 2005, p. 150). And this is independent of customers' location, since obtaining the feedback occurs through online presence or digital platforms. This allows a more cost-effective response to local needs and preferences.

Second, flexibility resulted from employing digital technologies enables international companies to respond to local preferences without losing the efficiency found in global integration (Nambisan et al., 2019, p. 1473). Mass customization is a useful example, by which individual markets and customers' needs can be fulfilled while cost reductions of mass production are also gained at the same time (Sambharya et al., 2005, p. 151). This is possible due to digital management of production and logistics processes. Mass customization requires a complex set of specifications adapted to each market or customer. Organizing such complexity is only possible through computer-based solutions. Moreover, digital technologies such as 3D printing allow the creation of customized products anywhere around the world while enhance efficiency due to standardized processes applied by such technologies. This enables international companies to respond to both pressures mentioned before.

The final aspect of digitalization's impact on the paradigm refers to an increase in efficiency by enhancing coordination of international business processes. Optimal management of value chain activities is crucial for MNCs and is associated with global efficiency. MNCs use an array of digital solutions to coordinate and control their international activities located in different countries (Sambharya et al., 2005, p. 148). Such technologies range from simple solutions (e.g., e-mail and video-conferencing) to more complex ones (e.g., ERP systems, blockchain-based smart contracts, and AI-based governance systems). In this regard, higher efficiency is achieved through improved communications and transparency because in this way, not only have top-managers and the headquarters (HQ) the possibility to monitor the real-time information in the company's GVC, but foreign subsidiaries can also share information between each other, which enhance coordination and efficiency (Luo, 2021, p. 4). This allows MNCs to adopt a more integrated global approach for their GVC while being more responsive to local needs due to enhanced communications between foreign units and value chain components.

More specifically, at the downstream side of GVC, digital technologies provide automated customer-specific transactions regardless of locations while involving local customers and stakeholders in product development; at the upstream side, real-time scheduling and decision-making between plants and also intense integration of various suppliers in the GVC increase global efficiency (Sambharya et al., 2005, pp. 148–149). Indeed, digital technologies foster integration between MNCs and its partners in various parts of GVC. However, they foster offshoring and outsourcing as well (Luo, 2021, p. 4), which enables MNCs to be more agile and responsive to local needs through outsourced locally adapted solutions.

Digital platforms, which are increasingly utilized by MNCs for their GVC, can manage such duality very well. On the one hand, they allow more foreign units, suppliers, distributors, customers, and generally stakeholders to be involved in the GVC and increase the responsiveness of MNCs to fulfill local preferences. On the other hand, such platforms increase efficiency by orchestrating stakeholders' activities through unified standards. In this way, MNCs can strengthen the advantages derived from both global integration and local responsiveness.

In conclusion, digitalization extends the global integration-local responsiveness paradigm and enables international companies to enhance efficiency through standardization while increase performance in foreign markets through digitalized adaptation. This suggest that digital technologies likely lead companies towards a transnational strategic orientation, not only at the industry and company level, but also regarding functions and subfunctions.

3.2 Conceptual Framework Based on Embedded Research Categories

In the previous section, several management-related theories and concepts were introduced, which are frequently used in the international business literature to discuss digitalization and its impact on MNCs and are relevant for this dissertation as a theoretical foundation. This section expands the theoretical foundation and provides a conceptual framework to draw a clear roadmap for exploring how digital technologies change international companies' business. The framework aims to assess and compare directly relevant publications and demonstrate research gaps under an organized order, referring to main aspects of international business.

3.2.1 Value Chain Configuration: The Location of Value Creation

Value chain, as described earlier, includes all activities necessary for bringing a product to market and supporting it after sale. This consists of various types of activities and components, from R&D and manufacturing to customer service. When these components are located in different countries (locations), value chain is considered international (Hennart, 2010, p. 261), and

becomes global when the number of countries increases and includes several regions around the world, hinting at a common characteristic of MNCs. The global scale outlines the geographical diversification of the value chain while highlights the locational importance of individual value chain activities (Laplume et al., 2016, p. 601).

Such geographical diversification is a result of value chain fragmentation, which is applicable when building blocks of a product are modular and standardized, allowing suppliers to provide different components according to specifications prescribed by the MNC (Butollo, 2021, p. 270). Digital technologies foster the fragmentation by standardizing components and processes. Once processes are digitalized, they tend to become modular and enable a high level of standardization. As a result, transaction costs and uncertainty of outsourced activities by external partners are reduced due to less need for coordination. This further enhances the fragmentation of GVC (Dachs et al., 2019, p. 5), and should allow MNCs to engage in more partnerships in different countries and have a diversified locational GVC. Moreover, information and communication technologies lead to enhanced intra-company interactions, and hence facilitate fragmented production processes (Chen & Kamal, 2016, p. 573). In addition, digitalized processes can easily be transferred across borders. This should further enhance the communication between different locations and manufacturing sites, which in turn enables MNCs to have a dispersed global network of production.

Regarding localized production, technologies such as 3D printing and additive manufacturing bring the organization of production to individual countries by enabling less centralized ownership and control of production (Hannibal & Knight, 2018, p. 1125). Such decentralized and often close-to-customers production, resulted from digitalized production, has the potential for reduction of transportation and logistics costs, which also incentivizes local production (Strange & Zucchella, 2017, p. 178). These advantages should theoretically result in a more geographically dispersed production system (Laplume et al., 2016, p. 602).

Another important aspect of value chain configuration is reshoring. Cost factors, especially labor costs, have served as the primary driver of offshoring to Asia. However, the advent of industry 4.0 and its related technologies may reduce the importance of such factors. Specifically, automation and additive manufacturing, as two digital technologies within industry 4.0, are expected to encourage Western companies to reshore (Ancarani et al., 2019, p. 367; Strange & Zucchella, 2017, p. 178). Since a highly automated production decouples labor from the process, labor costs lose its importance as a factor for offshoring (Butollo, 2021, p. 264). This

raises questions about location advantages derived from low-wage countries (Strange & Zucchella, 2017, p. 180), and implies that reshoring to traditional advanced economies is beneficial. Indeed, some companies have gone further and even relocated manufacturing activities back to their home country due to a lower share of labor and higher productivity provided by advanced robotics (Dachs et al., 2019, p. 5).

However, emerging markets have also invested in robotics, especially in the case of China, due to cheaper robot equipment and labor shortages in the country (Butollo, 2021, p. 265). This raises the question of whether arguments about reshoring in the literature are mainly speculations, since in reality the majority of Western companies still have manufacturing sites in Asia, and China still plays the role of a factory hub. Despite this, MNCs could reshore (or backshore to home country) due to quality priorities, which can mostly be achieved in automotive and electronics industries (Ancarani et al., 2019, p. 368), especially in the case of European automotive industry, a highly automated industry with intra-regional networks and the pressure to use suppliers with high-quality products (Butollo, 2021, pp. 265–266). Reshoring derived from automation and digitalization enable automobile manufacturers to improve quality and reduce costs without losing productivity (Ancarani et al., 2019, p. 368; Butollo, 2021, pp. 265–266). Moreover, MNCs may relocate their manufacturing activities back to home in order to benefit from the full flexibility and customization provided by new digital technologies and due to higher ownership advantages (Dachs et al., 2019, p. 5), reducing the risks associated with offshoring in distant markets.

The above-mentioned arguments suggest that digital technologies have the potential to affect MNCs' decision about the location of their GVC activities and encourage them to rethink offshoring strategies. However, advanced robotics and additive manufacturing, as the two prominent technologies inspiring this process, are still inefficient. Advanced robotics require considerable investments, making them difficult to acquire for most MNCs. Moreover, AI algorithms are necessary for advanced robotics, which have not yet fully developed to be able to completely eliminate labor factor from production. On the other hand, 3D printing is currently associated with low speed and high costs, making it not suitable for mass production. Therefore, research is needed to examine the speculations in the literature and determine how digital technologies have affected MNCs' location decisions.

The next discussion in the literature regarding the impact of digitalization on value chain configuration refers to foreign asset footprint. There is an assumption that digital technologies can help international companies enter to or operate in distant markets with lighter asset footprints,

and hence lower resource commitments (Banalieva & Dhanaraj, 2019, p. 1376; Casella & Formenti, 2018, p. 101; Hennart, 2019, p. 1393; Verbeke & Hutzschenreuter, 2021, p. 610). This assumption is emerged from internationalization patterns observed by highly digitalized industries, which typically avoid high investments in foreign countries (Casella & Formenti, 2018, p. 101). As an example, Uber has been able to expand its operations in many countries without the need for massive investments in physical assets in those markets. This was possible due to its highly digitalized processes. Digital platforms such as Uber provide modularity, not only for intangible assets, but also for physical ones (automobiles can be connected to Uber's platform from anywhere around the world). The global scalability caused by this modularity decreases the need for heavy physical footprint in foreign markets (Banalieva & Dhanaraj, 2019, p. 1376), as is the case for Uber, since the automobiles do not belong to Uber and cannot be considered as its resource commitments in foreign markets.

Traditional MNCs should also be able to benefit from above-mentioned advantages, since they increasingly employ digital platforms within their GVC, as discussed in section 3.1.4. Moreover, the use of digital technologies reduces transaction and coordination costs, making market-based mechanisms and partnerships more attractive and internalization through FDI less ideal. Thus, MNCs' foreign entry modes may be affected and more focused on international performance and increasing foreign sales rather than resource commitments through physical investments (Drori et al., 2024, pp. 3–4). This suggests that traditional MNCs could also exploit digitalization advantages, leverage foreign partners in their GVC, and decrease their asset footprints in host countries.

In this regard, the inward and outward FDI landscape might be influenced by the change of investment focus from developing countries to developed ones (Verbeke & Hutzschenreuter, 2021, p. 610), which is caused by locating less components of GVC in developing countries and further supports the assumption of reshoring. Such a trend may change FDI motives and highlights knowledge-seeking and financial motives compared to traditional market-seeking and resource-seeking considerations (Casella & Formenti, 2018, p. 102).

However, Verbeke and Hutzschenreuter (2021) suggest that sustained competitive advantages are unlikely to be achieved through asset-light foreign footprints. They argue that the arguments for lighter asset footprint in the literature are “illusory” and in most industries, both digital and traditional international companies need to be physically present in host countries (p. 613). This raises the question whether empirical evidence supports the expectations and arguments. Do digital and traditional MNCs differ significantly regarding the need for international footprints?

The knowledge-seeking motives are not only important for FDI decisions, but also for IT developments and acquiring talents. The widespread adoption of and advancements in digital technologies is leading to displacement of lower-skilled labor (Frey & Osborne, 2017, p. 267), while increasing the demand for high-skilled software specialists and data analysts (Strange & Zucchella, 2017, p. 179). This is relevant for MNCs, since they need to identify in which countries and locations such talents are to be found. There is concentrated knowledge creation in specific limited locations providing an environment for skilled labor (Becker et al., 2020, p. 108), known as technology hotspots. For IT development, Silicon Valley is a well-known place, in which many MNCs have already established subsidiaries. However, several other regions and clusters, such as London and Hyderabad, have also been able to provide a competitive environment for MNCs' investments (Aggarwal et al., 2011, p. 564).

These locations, both in developed and emerging countries, have intensified their efforts to attract foreign investments by concentrating on high-tech knowledge and innovation, which has caused "the war for talent" (Becker et al., 2020, p. 107). The growth of such locations derives from local talent pool, MNCs' global search for expertise, and internationalization strategies of service providers in the hotspots seeking to provide MNCs with expertise (Manning et al., 2010, p. 379).

Therefore, it is crucial for MNCs to determine where the technology hotspots locate and whether they need to establish FDI or go through partnerships with local service providers in order to benefit from the talent pool in the country. Without the access to highly skilled digital expertise, international companies would not be able to exploit digital technologies and their advantages. Thus, technology hotspots are relevant for international business activities. Moreover, some specific advanced technologies can only be accessed in specific countries. For instance, the USA and China have invested heavily in AI. It is probably crucial for MNCs to be present in such countries in order to benefit from the latest advancements in AI, robotics, microchips, etc.

Furthermore, global networks and internal digital platforms should allow international companies to develop knowledge in one specific subsidiary or location, which is competent for that specific knowledge, and transfer it to other locations (Grimpe et al., 2023, p. 661). This is possible due to connectivity caused by applying digital technologies, which allows international companies to relate different fields of knowledge in different locations (Alcácer et al., 2016, p. 504). Such a dispersed creation of knowledge is tied with subsidiary-specific advantages and should give MNCs the opportunity to select the best suited region, country, or subsidiary to

develop specific products and services. This further highlights the importance of technological clusters and emphasizes the need for identifying them and choosing the right entry mode to be present in those clusters.

In conclusion, the use of digital technologies in international companies has the potential to change the value chain configuration. Several possible impacts have been discussed in this section. Nevertheless, the impact can be broader and it is unclear how and exactly to which extent the digitalization of value chain activities has affected MNCs' location decisions in reality. Digital technologies do not create new value chain activities, but are integrated into existing activities and change the way that the activities are conducted. This may potentially alter companies' strategies of locating their GVC activities. Therefore, empirical research is needed to examine the above-mentioned impact and how the use of digital technologies influence companies' location of international business activities.

3.2.2 Digital Internationalization: Speed, Cost, and Location Advantages

The internet and its related connectivity have increased companies' ability to collect, store, and share information globally, and hence have changed how products and knowledge are transferred across borders. Moreover, digital technologies provide new opportunities for companies to analyze the collected information and operate in foreign markets more efficiently while reducing capital investments needed for their foreign operation. These advantages derived from digitalization may result in easier access to international markets and have the potential to directly affect companies' internationalization process.

In this regard, there is a positive relation between digitalization and internationalization. Indeed, a higher degree of digitalization leads companies to internationalize faster, by which international business competences in the digital era, including innovation and learning capabilities, play an important role (Lee et al., 2019, pp. 4–6). One reason for such a faster internationalization is reduced transaction costs of managing tangible assets (Parente et al., 2018, p. 53), since the internet and digital solutions enable companies to connect their assets across borders and within their GVC.

For digital companies, the internationalization process is usually based on their online international expansion rather than export or FDI, and is mostly known by non-equity entry modes such as corporate offices and international partnerships (Cahen & Borini, 2020, p. 13). The digital internationalization based on online expansion showcases a process, in which expansion in one foreign market raises the likelihood of adoption in other markets due to the importance

of users' network (Chen et al., 2019, p. 186). Such online expansion and non-equity entry modes should also enable an earlier and a greater speed of internationalization for digital companies compared to traditional MNCs, which are going digital and are still bound to significant capital investments and foreign assets.

However, the online expansion is tied with the availability of the internet and digital infrastructure in host countries (Ciulli & Kolk, 2023, p. 2). Countries differ in regard to internet availability, penetration, and policy. These can significantly affect international companies' location choices and online expansion. As an illustration, the US, Europe, and China as important markets follow different approaches in this regard. The US is known for its open and reliable digital infrastructure, whereas the EU prefers to protect customers. In contrast, China takes a restrictive approach. This divergence influences companies' internationalization decisions by limiting data flows and market access (Cha et al., 2023, p. 179). Moreover, a higher degree of internet penetration in host countries decreases the difficulties of cross-border online trades related to financial complexity, supplier restrictions, or dealing with foreign markets (Eduardsen et al., 2023, p. 446). Although the international business literature has pointed at the importance of digital infrastructure and its impact on digital companies' internationalization, it is not discussed exactly how the above-mentioned differences affect companies' international activities. In addition, its impact on traditional MNCs is less studied.

The internet and digital tools have also increased the competition in foreign markets. Digital technologies not only provide existing companies with smart and innovative solutions for their international activities, but also enable newcomers from different countries to compete with them (Katsikeas et al., 2020, p. 409). The reason lies in the fact that digital technologies allow loose couplings between components and are associated with low barriers to entry, meaning that small companies face with few barriers to make innovative ideas to actual market offerings (Saarikko et al., 2020, p. 827), which increases the number of rivals in the market. Drivers of such an increased competition are digital solutions, which enable close observation of competitors' performance, quick respond to marketing strategies, and collaborating with an extensive list of partners in different markets (Katsikeas et al., 2020, p. 409). This increased competition raises the question whether and how digital technologies help international companies, especially traditional MNCs, compete with local competitors, since new local companies are now able to disrupt industries and offer better value in host countries.

Despite the easier access to international markets for digital companies, they frequently deal with challenges regarding liability of foreignness and outsidership. Liability of foreignness is

derived from the lack of knowledge about local customers and cultural distance; liability of outsidership is the result of weak positions of digital companies in the host country (Meyer et al., 2023, p. 585). Successful business models of such companies can easily be imitated by local emerging companies and be applied in the home market with the advantage of better adapting to the market due to the enhanced familiarity of local customers by local companies (Parente et al., 2018, p. 58). Traditional MNCs can overcome these challenges due to the internalization of international activities, however, digital companies typically do not engage in FDI and may need to choose alternative solutions such as partnerships with established companies in host countries (Parente et al., 2018, p. 58).

However, Stallkamp et al. (2023) argue that digital companies also deploy FDI due to cultural and geographic distances (p. 823). Indeed, institutional, cultural, and geographic distances are the challenges, which MNCs have historically encounter when trying to access host countries (Verbeke & Hutzschenreuter, 2021, p. 611). This leads to a positive relation between distance and FDI, and make FDI very likely when the host country has a very different cultural or geographic environment (Stallkamp et al., 2023, p. 823). This should theoretically hinder the international expansion of digital companies into distant markets.

Digital platforms, which are frequently discussed in the international business literature and are relevant for both traditional MNCs and digital companies, are another solution to face with liability of foreignness. The resource orchestration capabilities necessary for the success of such platforms are non-location-bound, and hence can be implemented in all markets. This significantly decreases the issues related to liability of foreignness (Verbeke & Hutzschenreuter, 2021, p. 611). Moreover, international companies can also expand their digital platforms into countries with higher clout to mitigate the above-mentioned liabilities (Chen et al., 2019, p. 186). High-clout countries are considered as markets, which have more advanced economy and are close to each other in terms of social and cultural similarities (Meyer et al., 2023, p. 586). This suggests that there should be specific important foreign markets, which would facilitate companies' internationalization in the digital era due to their economic power, digital and internet adoption, customers' digital preferences, etc.

In doing so, it seems that digital internationalization is not necessarily associated with location-bound commitments or asset-seeking interests, but rather market-seeking drivers (Parente et al., 2018, p. 57). However, in many cases, bundling of digital assets with non-digital ones is crucial in such a digital expansion (Verbeke & Hutzschenreuter, 2021, p. 613), making asset-based international expansion necessary. In this regard, traditional MNCs may have advantages due

to their existing global network of suppliers and partners. By the use of digital technologies and innovative solutions, they can leverage competitive advantages in host countries through their global network and physical presence over born digitals (Meyer et al., 2023, p. 593).

Another important aspect of digital internationalization is national context. International companies follow specific digital business strategies (including platform strategy for digital companies and digital transformation for traditional MNCs) that illustrate interdependencies with their internationalization strategies (Meyer et al., 2023, p. 577). On the other hand, internationalizing companies are faced with complexities and uncertainties in contemporary markets caused by regulations and non-market factors (Verbeke & Hutzschenreuter, 2021, p. 607), implying a departure from the market-based global trade (Luo, 2024, p. 134). As a result, the interdependency is influenced by national contexts including formal and informal institutions as well as resource endowments (Meyer et al., 2023, p. 579).

In this regard, political uncertainty, corruption, and risk in host countries discourage internationalization (Cuervo-Cazurra et al., 2023, p. 222), even though MNCs' political experience from their home country enable them to deal with host country politics more sufficiently (Cuervo-Cazurra et al., 2023, p. 230). These factors also play an important role in the digital era, since more and more political issues are becoming digital technology-related, such as the tensions between the US and China in terms of accessing to new advanced technologies, affecting the global economy (Tung et al., 2023, p. 4). Moreover, various digitalization-related rules and standards around the world lead to digital regulatory risks causing disruptions to companies' international business activities (Luo, 2022a, p. 346).

More specifically, the number of regulations regarding data protection is increasing in developed and developing countries, encompassing different aspects such as customer protection, information security, and digital taxes (Luo, 2022a, p. 346). For instance, the introduction of the General Data Protection Regulation (GDPR) in Europe has forced companies to intensify their efforts and employ new capabilities in order to manage their data according to the regulation. Despite the importance of such regulations for internationally operating companies, it is still not clear how exactly the regulations and also political conditions affect companies' digital-related international activities. Except for affecting companies' international activities, the scope of such regulations can also impact the development of digital technologies themselves. As an illustration, it is known that the US and China have taken an open approach to AI technology in order to enhance its developments; on the opposite side, the GDPR in Europe significantly limits storing and processing personal information, which likely decreases the speed of

AI developments in the region (Haenlein & Kaplan, 2019, p. 12). This further emphasizes the role of regulations and politics regarding digitalization in international business and make it crucial to explore the impact of such non-market factors on digitalization-related international activities of companies.

The next internationalization-related subject influenced by digitalization is foreign market evaluation. Here, the question is whether digital technologies facilitate the recognition of suitable markets and identifying new trends. The amount of information available on the internet about countries economy, market segments, financial indicators, and customers characteristics together with the use of big data and AI algorithms make it easier for companies to evaluate foreign markets (Katsikeas et al., 2020, p. 410). Moreover, customers and users are becoming the center of digital products (Legner et al., 2017, p. 302). This makes foreign customers “a valuable source of knowledge for analyzing markets, competitors, technologies, and demands” (Luo, 2021, p. 4), which in turn enable international companies to gain knowledge about customers’ values and behaviors as well as business systems in host countries (Katsikeas et al., 2020, p. 410). Nevertheless, it is not clear if companies benefit from such opportunities and to which extent the available information and related technologies influence companies’ internationalization decisions.

Regarding gaining knowledge about foreign customers, digital platforms are a great tool to collect users’ information and their digital behavior. This gives international companies the ability to conduct “remote localization”, which demonstrates the capability of adapting products and services to local needs through “control and coordination” in the home country (Cha et al., 2023, p. 177). This should facilitate the identification of local preferences and local adaptation without the need for extensive local presence. Specifically, the use of AI capabilities enables digital platforms to enhance their knowledge about customers’ preferences, offers personalized solutions, and increase perceived user value. In this regard, data network effects, which is a result of higher level of learning from the data that digital platforms collect, lead to better understanding of users’ behavior, and hence offering a more valuable platform (Gregory et al., 2021, p. 534). This is even more crucial in international markets, in which learning from data and its resulted personalized solutions are bound to local needs, cultures, institutions, and companies’ ability to collect such data.

On the other hand, digital products themselves need to be adapted to local preferences. This includes user interface, monetization models, and even business models (Cahen & Borini, 2020,

pp. 9–10). The reason lies in the fact that customer adoption plays a crucial role in the internationalization of digital products, especially due to cultural and geographic distances (Stallkamp et al., 2023, p. 823). For instance, user interfaces need to be in local languages. Moreover, countries differ in regard to monetizing systems. Digital products have to adopt the monetizing system, which is the common system in the target country in order to increase their customer adoption.

The above-mentioned arguments suggest that managers in the home country are provided with rich data about international activities of the company, making central control and coordination easier (Meyer et al., 2023, p. 593). This raises the question how decision-making in higher levels of international companies is affected by the use of digital technologies. Are technologies such as AI being used for increasing the decision-making? How is the adoption of digitally taken decisions in different locations, since the adoption of such decision-making is influenced by different cultures (Duan et al., 2019, p. 69)?

In conclusion, internationalization of companies in the digital era is affected by the extent of digitalization in companies, industries, and countries. The connectivity emerged from digitalization enables easier access of companies to distant markets. However, it seems that the current landscape of digitalization-related regulations plays as a barrier for international expansion. Empirical research should be able to clarify how the use of digital technologies impacts companies' decisions and operations in foreign markets and answer the afore-mentioned questions and research gaps in this section.

3.2.3 Foreign Subsidiaries: The Concept of Dual Embeddedness

As demonstrated in section 2.2, an international company is typically known for its group of business units, including its HQ and foreign subsidiaries operating in various countries. The dispersed locations of subsidiaries have the potential to intensify digitalization's challenges and bring new challenges for such companies as well due to several reasons. First, partnership with companies from around the world is a new norm in the digital era and the knowledge created by the partners needs to be transferred between subsidiaries and across borders. Second, digital transformation of MNCs needs to be coordinated and streamlined across subsidiaries. And finally, foreign subsidiaries are typically the contact point to local institutions as well as customers. These reasons highlight the importance of investigating which role foreign subsidiaries play by the digital transformation of MNCs.

The above-mentioned aspects hint at foreign subsidiaries' relationships and hence at the concept of dual embeddedness, by which internal embeddedness implies the relationship of HQ with and across subsidiaries while external embeddedness indicates the relationship of subsidiaries with their local markets. MNCs' digital transformation is affected by these relationships, since there is a continuous tension between HQ' goals and desires on one hand, and foreign subsidiaries' needs and preferences on the other hand (Ekman et al., 2020, p. 586). Whereas HQ usually prefer an integrated cost-effective utilization of digital technologies within their global network, foreign subsidiaries might pursue their preferences to fulfill local markets' needs. This tension together with innovation developed at different locations have enhanced the digital-related knowledge of specific locations, resulting in differentiated capabilities of foreign subsidiaries (Alcácer et al., 2016, p. 505). In this regard, high-innovative subsidiaries may significantly affect how digital technologies are used in the company, despite the HQ' formal authority and control (Ekman et al., 2020, p. 587).

The above-mentioned differentiation represents subsidiary-specific advantages, which are crucial to explain the concentration of specific capabilities and digital assets in specific foreign subsidiaries (Grimpe et al., 2023, p. 661). Ultimately, the knowledge emerged from subsidiary-specific advantages and created in a specific location needs to be integrated with the core knowledge in the home country so that new digital solutions can be developed (Alcácer et al., 2016, p. 505). This highlights the importance of HQ-subsidiary relationship and the internal embeddedness of foreign subsidiaries in the digital era.

The external embeddedness is also pronounced due to digitalization. More precisely, the use of digital platforms has the potential to alter the location of knowledge generation and knowledge transfer in MNCs' global network. Contrary to traditional international business theories such as the internalization theory, which put an emphasis on the passive role of foreign subsidiaries and the usual transfer of knowledge from home to host countries, digital platforms and their connectivity enable foreign subsidiaries to benefit from the external skills and knowledge available in the local market and integrate the gained knowledge to the company's global network (Zeng et al., 2019, p. 11). In this matter, foreign subsidiaries are encouraged to cooperate with not only local suppliers, but also local customers, since they are both connected through the applied digital platform. This may change the passive role of foreign subsidiaries to an active knowledge-seeker and knowledge-coordinator, hinting at a different perspective compared to the internalization theory.

The above-mentioned arguments raise many important research questions about changes in the authority of foreign subsidiaries due to the extension of digitalization and whether traditional HQ-subsidiary relationships are still viable (Meyer et al., 2023, p. 593). In this regard, decentralized decision-making and knowledge development in subsidiaries seem to be preferred in highly digitalized and competitive markets (Zeng et al., 2019, p. 11).

Furthermore, Lee et al. (2023) divided digitalization-related value chain activities into two types of value creation (explorational activities such as R&D) and value capturing (exploitative activities such as marketing), and argued that the fulfillment of each activity type by HQ and subsidiaries has different results within the GVC (p. 623). However, Blomkvist et al. (2010) did not find an influential ability of foreign subsidiaries to contribute to the development of advanced technologies (p. 1538). On the other hand, it appears that the involvement of subsidiaries in large innovation projects with many stakeholders is common (Decreton et al., 2017, p. 870), probably implying the importance of such projects for the local market, in which the subsidiary is operating. In this matter, the mixed findings in the literature point at the fact that the role of foreign subsidiaries in the development of digital technologies or smart solutions is unclear. Especially, it is critical to explore to which extent foreign subsidiaries are involved in developing digital technologies. Do they also influence digitalization-related goals and strategies in their parent companies?

Regarding acquiring local digital and digital-related resources at least, foreign subsidiaries may play an important role. In contrast to internalization theory's suggestions and its emphasis on a vertical integration of FSAs and downplaying partnerships, inter-company cooperations are being increasingly paid attention in the contemporary international digitalized business (Pitelis & Teece, 2018, p. 528). Many of these partnerships occur in foreign countries and with foreign companies, which suggests a change in boundaries of an MNC from the company to the local network (Zeng et al., 2019, p. 11), highlighting the importance of foreign subsidiaries as the contact point between the MNC and local partners.

More importantly, digital platforms provide a structure, in which local companies as complementors can be integrated into the MNC's global network. This further fosters the ability to cooperate with local suppliers. However, as discussed in section 3.1.4, it is difficult to collect and access local complementary resources and suppliers (Verbeke & Hutzschenreuter, 2021, p. 612), especially when transactions are connected to physical components (Li et al., 2019, p. 1451), since physical components are usually attributed to location-boundedness of the resources. This emphasizes the role of within-country network effects in digital platforms

(Stallkamp & Schotter, 2021, p. 65). Such networks have a localized nature, since they are difficult to transfer between countries (Zeng et al., 2019, p. 10). In this regard, the external embeddedness of foreign subsidiaries and their access to local partners become critical factors in creating new knowledge and competitive advantages. National borders, different cultures, business environments, and legal frameworks make it necessary for MNCs to rely on their subsidiaries, which are familiar with local markets. This raises the question of whether foreign subsidiaries take the role of acquiring complementary resources and local digitalization-related assets. Do they also take the responsibility of coordinating local partners and their integration into the MNC's global network?

To benefit from economies of scale, HQ typically want a global orientation, by which all subsidiaries and business units follow the same digitalization strategy. However, the aforementioned internal and external embeddedness of foreign subsidiaries as well as influences of history and organization heritage hinder such an approach and may make digital transformation an incremental process (Ekman et al., 2020, pp. 586–587). In this matter, not only is the degree of embeddedness an important factor, but the size of the network also plays an important role (Decreton et al., 2017, p. 871), meaning that foreign subsidiaries in important markets with larger customer bases might have stronger influences on the digitalization of MNCs. In the same manner, important markets and their business environment may affect digital companies' strategies as well, even so such companies typically do not have foreign subsidiaries as its traditional concept, but rather offices in foreign countries.

At the end, political issues, regulations, and how foreign subsidiaries cope with them should also be paid attention. The relation between political issues, digitalization, and foreign subsidiaries is not often discussed in the international business literature. However, it is suggested that technological capabilities of subsidiaries can help MNCs mitigate geopolitical risks, since digital assets can be easily transferred across borders (Bussy & Zheng, 2023, p. 11), providing MNCs with the opportunity to manage the changes in host countries' political conditions. This suggests that foreign subsidiaries and their digital capabilities can also play a role in dealing with political issues.

In conclusion, foreign subsidiaries of international companies have always been discussed in the international business literature. Nevertheless, it is not sufficiently demonstrated which roles they play during the digital transformation of their parent companies. Moreover, traditional HQ-subsidiary relationships might be affected by the extent of digitalization, since digital

technologies provide new ways of conducting business processes, which might alter this relationship. Thus, it is crucial to explore how MNCs' foreign subsidiaries increase or decrease the parent company's ability to digitalize its international business activities.

3.2.4 Network Governance: The Role of Virtual Integration

GVCs have increasingly become complex as the result of globalization and companies' interactions with numerous international partners and suppliers. This is more critical for international companies because the number of interactions required to be coordinated increases when the company owns more assets and resources abroad (Alcácer et al., 2016, p. 507). In this regard, digital technologies increase the accessibility of assets from around the world through connectivity and digital infrastructures, which can result in fundamental changes of governance modes and coordination strategies (Autio et al., 2021, p. 4). With the increase in the employment of digital technologies in businesses and its potential to create new governance and coordination challenges, therefore, it is crucial for international companies to manage the above-mentioned interactions.

To this end, collecting, processing, and sharing of data play a crucial role for MNCs to identify interdependencies and control stakeholders' behavior in the GVC (Stonig et al., 2022, p. 1952). Accessing the data from local subsidiaries, suppliers, and partners should enable MNCs to have accurate insights about cross-border activities, which is much easier nowadays due to digitalization. Moreover, processing and analyzing the data acquired from cross-border interactions help companies adapt their strategies accordingly and better coordinate international activities. Despite the importance of data for governance and coordination, not sufficient attention has paid in the literature on how data and digital assets enhance MNCs' ability to coordinate their cross-border activities.

To illustrate, the concept of the global factory has been used by many scholars, referring to a network of manufacturing sites around the world, which is possible due to not only globalization, but also digitalization, since digital technologies enable the necessary connectivity for such a global network. Nevertheless, there is a lack of research on the governance of the global factory. More precisely, it is not clear, who controls the factories in different countries (Buckley & Strange, 2015, p. 246), how digital technologies enhance the coordination between them, and how the data gathered through these factories affect the MNC's decision-making as well as other international activities.

The scope of data availability and the access to better information about cross-border and subsidiaries' activities, as a result of digitalization, suggest that more and more decisions will be made in the home country, leading to a more centrally control over international activities (including factories and manufacturing sites). Indeed, Schmitt et al. (2019) show that digital technologies and their related automation in data collection and analysis about cross-border activities are believed to lead to more involved and more powerful HQ (p. 3). Moreover, digitalized governance tools, such as AI-based behavior control or blockchain-based smart contracts, serve as "a powerful coordination and control mechanism" in global networks (Verbeke & Hutzschenreuter, 2021, p. 609), which theoretically enables MNCs to increase centralization and decrease the level of autonomy for foreign subsidiaries. These arguments emphasize the need for exploring whether digital technologies have the ability to strength HQ' position and their autonomy within MNCs' global network.

Regarding governance choices, markets and hierarchies have been known as two governance alternatives for a long time. However, digitalization has changed many aspects of both mechanisms, as discussed previously. In this regard, digital network governance is believed to be a third choice, which differs from traditional dyad networks (Banalieva & Dhanaraj, 2019, p. 1380). Such networks not only have the ability to manage internal interdependencies within MNCs' value chain, but also external ones. This is critical in the contemporary business environment, by which partnerships and external stakeholders play an important role in companies' growth. These networks facilitate orchestration and monitoring of international activities (Drori et al., 2024, p. 4), which occurs through incentives and control; incentives include sharing of resources, provision of information, conferring autonomy, and giving rewards while control encompasses access, output, behavioral, and external control (Chen et al., 2022, p. 156).

Despite the above-mentioned arguments, Hennart (2019) argues that networks are not a new governance choice and not a universal solution, since companies vary significantly in regard to their structure and industry-specific control mechanisms (p. 1397). Nevertheless, digital networks have the capacity to enhance MNCs' ability to manage their internal and external business processes within their GVC (Verbeke & Hutzschenreuter, 2021, p. 609). This remains as a prediction and requires more research to explore its validation, especially that most research regarding digital network governance has considered companies in industries with a high-degree of digitalization. Therefore, it is crucial to examine how such digital tools influence governance choices in more traditional MNCs.

Furthermore, digital platforms seem to have different governance structures. Chen et al. (2021) assume that semi-decentralized governance structures may allow such platforms to facilitate the balance between control and coordination of platforms' participants, since none of the participants have more control than others in a pure decentralized structure, leading to complex decision-making (pp. 1325–1327). This is in line with Banalieva and Dhanaraj's (2019) argument that hints at hybrid nature of digital governance, by which markets allow for cooperations while hierarchies control the internal activities (p. 1380). Crucially, such digital tools still need to partly rely on local data, assets, and components (Verbeke & Hutzschenreuter, 2021, p. 613). This suggests that a fully centralized governance through digital technologies seems unlikely.

The next aspect of discussion is the coordination of international activities. It is widely accepted that the current global scope of value chain activities by MNCs leads to an increased need for coordination of activities within GVCs and among partners. To this end, scholars have proposed various coordination instruments and have examined their efficiency over the years. Among them, technocratic and person-oriented coordination instruments are noteworthy. The former group implies vertical integration through the use of standardized tools and rules while the latter focuses on face-to-face interactions between humans. In this regard, person-oriented instruments have been found to be more flexible and efficient to deal with complex interdependencies between subunits of an MNC (Holtbrügge, 2005, p. 566), resulting in a shift of attention from technocratic to person-oriented coordination instruments in the literature. However, Wolf et al. (2014) argued that technocratic instruments (together with other types of coordination instruments) are still important and play a crucial role, especially for transferring technology across borders (p. 121).

Technocratic coordination instruments are based on standardized tools such as formal reporting systems or centralization and standardization of decisions. Centralization and standardization are organizational tools for control and coordination; the former implements hierarchy mechanisms to reach the intended goals while the latter uses standardized processes and rules (Zeng et al., 2023, p. 1602). Similarly, digital technologies bring standardization to business processes and facilitate vertical integration. Therefore, one could argue that with an increase in digitalized business processes, there is less need for person-oriented coordination instruments, and technocratic instruments can become the more dominant tools in the digital era. However, the today's international business environment is very complex due to the trend for partnerships, national contexts, institutional and geopolitical issues, etc. Thus, technocratic instruments may not be enough or sufficient to cope with such challenges, even though more and more business

processes are becoming automated, eliminating face-to-face interactions between humans. As a result, an attempt will be made to clarify whether person-oriented coordination instruments have lost their importance in recent years due to a higher degree of digitalization in MNCs.

This clarification is also relevant for identifying the impact of digital technologies on cross-border knowledge transfer. Transferring knowledge between subsidiaries can be challenging due to geographic distance and institutional obstacles. For this purpose, human resources play an important role to exchange knowledge. Nevertheless, digital technologies and communication services have the ability to make knowledge transfer between subunits of an MNC more efficient by reducing the need for face-to-face exchange (Bucher et al., 2024, p. 1792).

However, not all types of knowledge can be transferred digitally. For instance, tacit knowledge does not seem to be transferable without the need for face-to-face interactions. In fact, tacit knowledge is embedded in human beings and can be exchanged only by moving people, making relocation of human resources within MNCs' network a critical aspect (Biggiero, 2006, p. 456). To this end, hierarchy is probably the most appropriate form of managing international transfer of human capital (Banalieva & Dhanaraj, 2019, p. 1381). This suggests that FDI and internalization of knowledge ensure a more extensive cross-border knowledge transfer (Biggiero, 2006, p. 455).

Despite the above-mentioned arguments, digital technologies such as augmented and virtual reality, and online meetings allow human capitals to exchange knowledge across borders without the need for being present in the location. This is different from automation, since no tasks are automated in such digital interactions, but they rather serve as a platform for humans to interact with each other. Moreover, technologies such as AI and gamification enable training of employees via online tools, which reduces the need for moving people. This raises the question whether tacit knowledge can also be transferred digitally and without international relocation. In this regard, Bucher et al. (2024) found that digital networks play an important role by transferring knowledge internationally, although long-term international assignments still are crucial for MNCs (pp. 1816–1817). Nevertheless, it remains unclear to which extent the use of digital technologies facilitates international knowledge transfer, not only for exchanging tacit knowledge, but also for the training of employees across borders.

The next relevant aspect of discussion refers to the increasingly popular trend of partnerships between international companies. As mentioned before in section 3.2.1, digital technologies enable the fragmentation of value chain activities. The dividing of processes into smaller ones

and the modularization resulted from such fragmentation increase the control of companies on each part of the value chain and enable them to collaborate with external partners to reduce costs (Chen & Kamal, 2016, p. 573). These partnerships (including joint ventures, strategic alliances, etc.) is associated with partial integration and hybrid modes of governance, suggesting at different governance alternatives (Hernández & Pedersen, 2017, p. 140).

More specifically, the partnerships in the digital era are mostly aimed at increasing innovation. Innovative activities are tied with the need for higher coordination and stronger governance mechanisms, which can prevent knowledge leakage and allow better knowledge transfer (Lewin et al., 2009, p. 916). This seems to be achieved through hierarchy and FDI. However, current GVCs tend to be more connected and have more independent companies and partners coordinated by a network, hinting at the tendency towards horizontal integration (Hernández & Pedersen, 2017, p. 140). In the same manner, virtual integration of external partners, facilitated by digital technologies, can likely prevent opportunism and increase performance in international relationships between companies and suppliers (Jean et al., 2020, pp. 589–590). There are a couple of research questions arisen from such a trend in international business. First, what is the role of partnerships for international companies, whether to have access to new technologies or maybe to cope with the competition? Second, how do international companies manage the integration of external partners into their GVCs? And finally, how do digital technologies facilitate this process?

The answers to above-mentioned questions are crucial, since there is also a new trend in companies, by which existing products themselves become the center of a digital platform and create a new ecosystem. Indeed, research shows that companies can follow this strategy and co-create a new platform together with external partners by modularizing and standardizing the components of the product (Stonig et al., 2022, p. 1950). In this case, the focal company plays the role of the lead and conducts various governance mechanisms to control and coordinate the activities of all participants.

The extent of digitalization and partnerships also raises important questions regarding governance structures and internalization advantages, including: Which value chain activities should be internalized and which ones externalized? Do MNCs prefer to internalize knowledge while externalize operations (Strange & Zucchella, 2017, p. 181)? The number of partnerships announced by international companies suggests that every part of value chains is subjected to externalization. Nevertheless, there are still proprietary assets and knowledge, which should be kept away from competition, highlighting the importance of internalization advantages.

The last aspect of managing interdependencies within an MNC refers to the advancement of specific functional areas in developing and using digital technologies. Digitalization has caused many changes in production processes, with industry 4.0 connecting manufacturing locations and altering the role of low-skilled employees. In this regard, Stawiarska et al. (2021) assessed the level of digital maturity in different functional areas and found that they vary depending on the size of companies and the level of commitment to implementing new technologies. It seems that production and human resource management are among the more advanced business functions while product innovation scoring the lowest maturity (pp. 14–15). However, their study only included the automotive industry, raising the question of whether the digital maturity of functional areas differs in other industries, especially when the internationalization-related aspects are considered.

In conclusion, market and hierarchy have always been considered as the two alternatives of managing cross-border activities. In this regard, digital technologies seem to have introduced new ways of governing MNCs' global network. Digital governance tools are expected to facilitate international companies' control over their business processes. However, the impact of such tools in practice is associated with many predictions in the international business literature. Moreover, it is crucial to examine how digital solutions enhance coordination of interdependencies between various subunits in an MNC.

3.3 Positioning of the Study Based on the Conceptual Framework

Previous sections attempted to provide an enhanced understanding of digitalization's influence on well-known research theories in the area of international business as well as an overview of directly related studies and statements regarding the use of digital technologies in international companies and how the usage might change their international operations. In this regard, various aspects of the influence were discussed. These theoretical and conceptual foundations should help formulate this study's directions and position them among the international business literature.

Digitalization has been the center of many studies in the international business literature, mostly during the last decade. However, specific aspects of digitalization and internationalization have been paid attention by the studies, such as speed of internationalization (e.g., Lee et al., 2019; Parente et al., 2018), international performance (e.g., Bhandari et al., 2023), digital platforms (e.g., Jacobides et al., 2018; Li et al., 2019; Nambisan et al., 2019), etc. This demonstrates “a partial and fragmented picture” of the relation between digitalization and internationalization

(Bergamaschi et al., 2021, p. 985). Moreover, most research has focused on positive consequences of employing digital technologies in international companies (e.g., Brouthers et al., 2016; Hooper & Holtbrügge, 2020; Stallkamp & Schotter, 2021; Vadana et al., 2021), with just a few examples pointing at challenges and negative aspects of digital transformation (Luo, 2022a; Verbeke & Hutzschenreuter, 2021). This further leads to fragmented research in this area, creates an unstructured research field, and prevents the providing of a comprehensive view of consequences resulted from applying digital technologies in international companies.

More importantly, less focus has been given to empirical observation of the actual impact that digitalization causes in business practice. In this regard, a great portion of the research consists of case studies and conceptual papers (e.g., Jacobides et al., 2018; Legner et al., 2017; Luo, 2021; Meyer et al., 2023; Verbeke & Hutzschenreuter, 2021). In addition, some papers concentrated on future applications of digital technologies in international companies and their resulted impacts (e.g., Laplume et al., 2016; Parente et al., 2018; Strange & Zucchella, 2017). These two streamlines in the literature have led to the point that many statements of the authors are predictions and assumptions without any empirical examination, even though the predictions are based on current digital technologies' development, giving validity to authors' statements. Therefore, it makes sense to take a closer look at the relation between digitalization and companies' internationalization in order to provide validation to published statements in the literature, fill the research gaps, and enhance the understanding of digitalization's impact on international companies.

Furthermore, very few studies have explored the role of individual digital technologies in changing business processes and their impact on GVCs or companies' international activities (e.g., Ahi et al., 2022). As demonstrated in table 2, individual technologies can have different impacts on international companies' operation. While the literature tends to focus on digitalization as a whole, a more detailed examination of the role that individual technologies play in the digital transformation of international companies, can help specify the impact of digitalization on companies' international activities.

Given the above, this dissertation attempts to explore the impact of digital technologies on international companies' cross-border operations. In this respect, the following research questions, also introduced at the beginning of the dissertation, are formulated based on the conceptual framework discussed in previous sections:

- 1) How and to which extent does the use of digital technologies influence companies' location of international activities/the configuration of the GVC?
- 2) How and to which extent does the use of digital technologies influence companies' internationalization decisions in general?
- 3) How and to which extent does the use of digital technologies influence companies' foreign subsidiaries and their roles?
- 4) How and to which extent does the use of digital technologies influence companies' governance/management/coordination modes?

The first question focuses on GVCs and the location of value chain activities. Industry 4.0 and its related digital technologies have specifically the potential to reshape the configuration of value chains and encourage MNCs to relocate specific parts of their value chain. The second question deals with internationalization-related issues. The impact of digital technologies on companies' expansion to other markets or product adaptation to international markets should be discussed under this question. The third question is designed to find out which role foreign subsidiaries play in the digital era, since digital technologies theoretically allow a more centralized management of business processes. Finally, the last question aims to cover the change in the management of interdependencies emerged from the extensive use of digital technologies in international companies.

By answering these questions, this dissertation is aimed at exploring how the use of digital technologies in international companies affects their cross-border business activities. This examination will be conducted, analyzed, and showcased under four groups, representing the above-mentioned four research questions respectively as well as the research gaps discussed in previous section. These groups include "location of activities", "internationalization-specific decision-making", "foreign subsidiaries and their roles", and "governance, management, and coordination".

Overall, this dissertation is intended to provide a comprehensive view of the impact of digital technologies in practice by covering various international business-related aspects, filling the research gaps, and giving clarification to some debates in the literature.

3.4 Connecting of the Theoretical Framework and the Research Questions

After providing theoretical and conceptual frameworks, which included the introduction of six theories and concepts as theoretical foundations alongside the discussion of four research questions as the objectives of this dissertation, this section attempts to connect these two parts. More specifically, it is intended to show how the selected theories and concepts are likely to contribute to answering the four research questions of this work.

To begin with the first theory, TCT is relevant for explaining the location of activities in GVCs. Current value chain activities of MNCs are fragmented and conducted by various suppliers around the world, highlighting the complex set of transactions between MNCs and their partners. In this regard, the standardization and its resulted modularization provided by digital technologies reduce transaction costs (Autio et al., 2021, p. 8), enabling more efficient market-based mechanisms. Thus, TCT is an appropriate theory to discuss the interactions between different components of GVCs.

Regarding internationalization-specific decision-making, TCT can explain the possible faster internationalization in the digital era. The reason lies in the fact that MNCs can reduce transaction costs of managing their tangible assets across borders due to the connectivity provided by digital technologies (Parente et al., 2018, p. 53). Moreover, the connectivity reduces the costs of acquiring information about foreign markets and also partners, which favors market mechanisms and makes hierarchy less desirable. This may alter resource commitments in foreign countries (Drori et al., 2024, pp. 3–4), and further support the idea of lighter asset footprints.

Regarding foreign subsidiaries and their roles, TCT has the potential to interpret the external embeddedness between foreign subsidiaries and local partners in the digital era. Since digitalization may change the traditional passive role of subsidiaries to an active knowledge-seeker through partnerships with local companies, the transactions between foreign subsidiaries and local companies become important, which can be explained by market-based mechanisms.

Regarding governance and coordination, TCT is well-equipped to provide an analysis of different governance modes and coordination needs. Digital technologies can reduce transaction costs in both market and hierarchy due to standardization of processes (Chen & Kamal, 2016, p. 566). On one hand, internal coordination costs are minimized, resulting in more efficient governance; on the other hand, reduced external coordination costs lead to better management of inter-company interactions. Both are crucial in the digital era, in which hybrid systems are becoming dominant due to the intensive engagement of companies in partnerships. One step

further, research suggests that digital networks are new tools, which use incentives and control to orchestrate international activities (Banalieva & Dhanaraj, 2019, p. 1380; Chen et al., 2022, p. 156), which again points at hybrid systems and their related transaction costs.

The RBV, KBV, and dynamic capability view can be helpful in the discussion of the search for high-skilled software developers in different locations as well as the importance of technological hotspots, representing the location of activities. This is due to the fact that advanced digital technologies and their associated know-how are considered as strategic resources (Pereira & Bamel, 2021, p. 558), pointing at the KBV while digital connectivity enables MNCs to recognize the location, time, and types of necessary capabilities (Luo, 2022b, p. 970), highlighting the relevance of dynamic capabilities. Moreover, the discussion of local digital assets and the need for their linkage with local physical assets are to be explained by the RBV.

Regarding internationalization-specific decision-making, RBV may explain the need for being active in more foreign markets in the digital era, since digital resources cause higher international market penetration (Autio & Zander, 2016, pp. 3–4) and the data gathered through local users and their preferences are unique to the company, considered as FSAs. This makes foreign customers “a valuable source of knowledge” (Luo, 2021, p. 4) and puts “what a firm does” with such sources in the perspective of KBV (Cuthbertson & Furseth, 2022, p. 171). The emergence of local competitors due to digitalization and the need for agility of MNCs are then explainable by dynamic capabilities.

Regarding foreign subsidiaries and their roles, the dispersed creation of knowledge and its related subsidiary-specific advantages alongside the concentration of specific capabilities and digital assets in specific subsidiaries, which are common in today’s international business, can be explained using RBV and KBV. Moreover, internalizing the digital resources acquired locally at subsidiaries facilitates dynamic capabilities (Cuthbertson & Furseth, 2022, p. 174).

Regarding governance and coordination, RBV can be used to explain the necessity of adapting, scaling, and protecting data and algorithms in different markets as well as linking the data to local users’ unique physical assets, which represent the VRIN principles (Cuthbertson & Furseth, 2022, pp. 171–172). In terms of knowledge transfer, KBV and dynamic capabilities can explain the benefits of using digital technologies to train local employees, which eliminates or at least reduces the need for moving people. This fosters rapid adaptation to changing environments of innovation development.

The internalization theory and the eclectic paradigm are instrumental in explaining the location of activities and the previously discussed reshoring of Western companies because location advantages such as low-cost labor have been one of the reasons for MNCs to establish FDI in foreign markets, which might lose their importance due to automation. In the same way, technological hotspots can demonstrate location advantages for MNCs due to their availability of high-skilled labor. Moreover, technologies such as 3D printing have the potential to change ownership advantages of an MNC and can lead to a more geographically dispersed production system (Laplume et al., 2016, p. 602).

Regarding internationalization-specific decision-making, the eclectic paradigm can explain the possible faster internationalization in the digital era, since location advantages are less about low-cost labor and scarce raw materials, but more about knowledge and know-how (Luo, 2021, p. 3). In this regard, digital connectivity enables cooperations and reduces specificity of different country-specific assets (Luo, 2021, p. 4). This means internationalization may require fewer physical assets due to digitalization. Moreover, internalization theory can explain why MNCs can better deal with liabilities of foreignness and outsidership emerged from less familiarity of digital INVs about foreign markets, since such companies typically do not engage in FDI (Parente et al., 2018, p. 58).

Regarding foreign subsidiaries and their roles, the internalization theory and the eclectic paradigm can be helpful to explain why specific foreign subsidiaries in specific markets are more influential in regard to digitalization of MNCs. This is likely due to the fact that important countries, typically larger markets, represent location advantages in terms of having larger customer bases, and hence are more involved in the development of digital solutions. In addition, market knowledge is a location-bound FSA, which foreign subsidiaries usually have about the market, in which they are operating and the company needs to internalize such knowledge.

Regarding governance and coordination, knowledge creation through partnerships is an important discussion in the digital era, by which hybrid mechanisms are frequently applied to gain the knowledge and then integrate it within the MNC's network. Internalization theory and the eclectic paradigm explain how this knowledge can be efficiently internalized through digital connectivity (Luo, 2022b, p. 972). Moreover, the two theories are helpful in the discussion of whether HQ are becoming more powerful due to digitalization. Since digitalization can make FSAs non-location-bound and more easily transferable, more activities can be organized and governed centrally.

The concept of digital ecosystems and platforms is useful in discussing location of activities, especially technology hotspots, since such hotspots represent one type of business ecosystems defined as an economic community of interacting stakeholders that affect each other's activities (Jacobides et al., 2018, p. 2257). Moreover, digital platforms facilitate market-based mechanisms and partnerships, which may lead to less physical resource commitments in foreign markets (Drori et al., 2024, pp. 3–4). This further helps the discussion of lighter foreign asset footprints due to digitalization.

Regarding internationalization-specific decision-making, faster internationalization and the importance of specific foreign markets with larger customer bases can be explained by the concept of digital platforms. The reason lies in the fact that positive network effects as the most important characteristic of such platforms are associated with more users, which can be achieved in specific markets more easily. In addition, the use of digital platforms by MNCs helps them reach global customers more effectively, which results in better international performance (Li et al., 2022, p. 1831), and adapt their products and services remotely to local needs in the home country (Cha et al., 2023, p. 177).

Regarding foreign subsidiaries and their roles, more and more MNCs are using digital platforms to foster partnerships and benefit from the knowledge created locally. However, accessing complementary resources in international markets is difficult due to challenges of familiarity with local markets and ownership of key assets (Verbeke & Hutzschenreuter, 2021, p. 612). In this regard, different cultures and business environments become crucial factors for acquiring partners as the necessary complementary resources. The connection between the concept of digital platforms and foreign subsidiaries is then the external embeddedness, which should help answer the question of whether subsidiaries play an important role in acquiring local resources in the context of digital platforms.

Regarding governance and coordination, digital platforms are powerful tools to manage and coordinate interdependencies between global stakeholders. Such tools are even considered as the third choice of governance (Banalieva & Dhanaraj, 2019, p. 1380). Therefore, the concept is an important element of discussion about governance and coordination in the digital era. Moreover, the extensive use of digital platforms can also explain whether digitalization leads to more powerful HQ, since MNCs can orchestrate international activities of foreign subsidiaries and partners through central control possible by digital platforms.

The concept of digital human capital is relevant for the discussion about location of activities. The increased demand for IT professionals and its related technology hotspots is explainable by this concept, which emphasizes the need for an effective strategy to acquire the necessary digital talents from around the world. The concept of digital nomads, which is a part of digital human capital, also helps the discussion because such talents are typically to be found in specific locations such as Spain. This makes these locations very important for MNCs in regard to their search for specialists of developing digital solutions.

Regarding internationalization-specific decision-making, the above-mentioned talents are usually located in specific regions or countries. This suggests that MNCs may need to expand their presence in those countries in order to benefit from the talent pool. This means that global talent pools can affect the internationalization strategies of companies and encourage them to extend their activities, engage in partnerships, or establish foreign subsidiaries in the locations, in which such talents are concentrated. This might explain the reason why many MNCs establish FDI in Silicon Valley or similar locations.

Regarding foreign subsidiaries and their roles, digital technology affordance of subsidiaries and the access to latest systems are very important factors for IT professionals (Tambe et al., 2020, p. 3012). This highlights the role of foreign subsidiaries as the contact point to such employees and the need for them to provide the above-mentioned opportunities. If foreign subsidiaries can develop digital human capital by attracting digital talents, they may be able to develop specific capabilities. This may explain the differentiated capabilities of foreign subsidiaries in the digital era (Alcácer et al., 2016, p. 505).

Regarding governance and coordination, retaining digital human capital and digital talents is also a crucial aspect for MNCs to maintain their capabilities. This is possible through providing learning opportunities (Grimpe et al., 2023, p. 678) and socialization for digital nomads (Nash et al., 2021, pp. 272–273). To this end, internal digital networks of MNCs can provide an efficient tool to govern and coordinate the knowledge transfer necessary for the above-mentioned learning or communication with other employees. Moreover, technologies such as AI and virtual reality enable virtual training and sharing information, which is beneficial for digital nomads, who work mostly from the location of their choice and do travel only for leisure purposes. This would help MNCs as well, since they can internalize the tacit knowledge gained through digital talents more efficiently.

The concept of global integration-local responsiveness is helpful to answer the research questions about location of activities because the paradigm is applicable at the level of industries, companies, functions, and subfunctions, as described before. This means those international activities that are standardized can be globally integrated while those that should be adapted to local needs are locally bounded. For instance, 3D printing allows for adaptation of products to specific local preferences. An MNC can employ localized production while follow globalized marketing strategies about the product that is produced through 3D printing in different markets. Mass customization is another example of such an approach, which combines the advantages of both integration and responsiveness through the use of digital technologies (Sambharya et al., 2005, p. 151).

Regarding internationalization-specific decision-making, similarities of preferences in different foreign markets emerged from digital connectivity and availability of information (Naz & Ahmad, 2018, pp. 137–138) can be explained by global integration while the role of national contexts in digital internationalization of companies is related to local responsiveness. Yet, digital products also need to be adapted locally (Cahen & Borini, 2020, pp. 9–10). More importantly, the discussion about data protection laws as well as differences in digital infrastructure in Europe compared to the USA and China are well explained by the regional strategy stemming from the global integration-local responsiveness paradigm.

Regarding foreign subsidiaries and their roles, the relationship between HQ and foreign subsidiaries in regard to digitalization can be explained by the global-local paradigm, since HQ usually pursue an integrated and standardized approach of using digital technologies whereas foreign subsidiaries might prefer local adaptations. However, digital platforms can facilitate the fulfillment of both pressures (Nambisan et al., 2019, p. 1478). In addition, the paradigm might explain the mixed findings about the role of foreign subsidiaries in developing digital solutions. Some digitalization-related projects are defined by HQ and have the intent of global use while other projects are developed to be employed locally to fulfill subsidiaries' needs.

Regarding governance and coordination, global integration explains why MNCs need to increase global efficiency by coordinating their cross-border activities (Luo, 2001, p. 451). Since digitalization standardize many processes, global management of value chain activities becomes more efficient. On the other hand, local responsiveness is helpful in the discussion of local adaptation through partnerships with local suppliers, which is facilitated by digital platforms. Moreover, the debate whether HQ become more powerful in the digital era can also be

explained by the global integration-local responsiveness paradigm because digitalization enables a high level of standardization and hence, more and more processes can be governed centrally. This may lessen the need for local responsiveness.

In conclusion, the six theories and concepts as the theoretical framework of this dissertation are instrumental in the discussion of the research questions. Whereas TCT, RBV, internalization theory, and global integration-local responsiveness have been used for a long time by scholars to describe international companies and their cross-border activities, the concepts of digital ecosystems and digital human capital are newer; they have gained attention in recent years in the international business literature due to the extensive digitalization of business processes. The integration of the above-mentioned theories and concepts should then help the discussion in the chapter 5 in order to answer the four research questions.

4 Method of the Empirical Part of the Study

Answering the afore-mentioned research questions requires the determination of a solid research approach together with the corresponding research techniques in order to ensure the validity of the findings. This chapter describes the method, which was applied to empirically conduct the study and find the answers. To this end, the first section assesses the research method alternatives, the second section demonstrates the research design, and the last section discusses the considered criteria to ensure the quality of the research procedure.

4.1 Selection of the Research Procedure

For this dissertation, an explorative procedure in form of a qualitative research was selected, by which semi-structured interviews were conducted. This section argues why such a selection was the right approach to find the answers of the research questions.

4.1.1 *Research Approach: Quantitative vs. Qualitative Studies*

Research in management, including international business, spans a broad spectrum of methods, each tailored to different types of questions and objectives. In such a dynamic field, a critical distinction is often made between quantitative and qualitative research approaches. Quantitative research uses measurements in a deductive orientation to collect and analyze data (Bryman et al., 2022, p. 36), meaning that numerical values play an important role to empirically study a phenomenon (Taherdoost, 2022, p. 54). In contrast, qualitative research relies on words to extract the findings inductively, which is predominant in such a research approach (Bryman et al., 2022, p. 37). This approach is associated with rational, explorative, and intuitive research (Ghauri et al., 2020, p. 97). Despite the above-mentioned norm that quantitative research usually adopts a deductive orientation and qualitative research an inductive one, the former can also be conducted inductively to develop new theories, and the latter deductively to test an existing theory (Saunders et al., 2016, pp. 166–168). To provide a clearer and more detailed demarcation, table 3 demonstrates key differences of the two research approaches.

The choice between quantitative and qualitative approach is ultimately dependent on the research subject. Both approaches offer distinct advantages and are suited to different types of research questions. In this regard, personal preference, research context, and time could also influence the decision (Bryman et al., 2022, p. 39).

Table 3: Characteristics of Quantitative and Qualitative Research

	Quantitative	Qualitative
Nature of data	Numerical and statistical data	Textual and first-hand data
Approach	Mainly logical and objective	Interpretive and subjective
Theorizing	Deductive and explanatory	Inductive and explorative
Data collection	Surveys, questionnaires, etc.	Interviews, case studies, etc.
Goal	Testing existing theories	Building new theories
Research process	Standardized, fixed	Non-standardized, flexible
Data analysis	Mathematical (e.g., regression)	Thematic (e.g., content analysis)
Generalizability	Statistical generalization	Theoretical generalization

Source: Based on (Bryman et al., 2022; Ghauri et al., 2020; Saunders et al., 2016)

The quantitative approach does not appear to be the right one for this dissertation, since adequate knowledge about the research subject should be available for this approach in order to test theories and verify hypothesis (Taherdoost, 2022, p. 54), meaning that a structured field of research is needed to be able to generate hypothesis in the beginning. The research questions discussed in previous sections, however, imply an unstructured and fragmented research field, by which various aspects of the impact of digital technologies on companies' international activities have not been discovered yet.

On the other hand, qualitative approach is associated with collecting primary data, which enables finding new insights about the research subject and is beneficial for the purpose of this dissertation due to its exploratory nature (Taherdoost, 2022, p. 54). More specifically, such an approach is aimed at answering the “how” and “why” of activities, revealing the “black box” of business processes (Doz, 2011, p. 583). This suits the objectives of this dissertation, since it is focused on such questions rather than “what” or “how much” of the impact of digital technologies in organizations. For instance, it is intended to find whether and why the use of digital technologies affects foreign subsidiaries' roles in MNCs or how digitalization can alter companies' location choices. The examination of such questions requires new insights into the subject, which have not been provided by the literature. The lack of insight prevents hypothesis generation, which is necessary for a quantitative approach.

Furthermore, qualitative examination or re-examination of the literature allow researchers to test perceptions and find new phenomena (Bluhm et al., 2011, p. 1869). This means the qualitative approach can also test the validity of assumptions emerged from theories and compare the predictions made in the literature with real-world practices (Doz, 2011, p. 584). In this regard, there are various predictions and assumptions about the impact of digital technologies in the literature, as described in previous sections. A qualitative approach should make it possible to test their validity, and extent or challenge their applicability.

And finally, there is lack of knowledge in the international business literature about how MNCs operate nowadays and how their globalization occurs compared to decades ago (Doz, 2011, p. 587). Most research is focused on micro aspects of digitalization and to which extent it can alter specific business processes, leading to predictions and assumptions about the general picture of the impact. Therefore, qualitative research is desirable in the international business literature to discover new ideas on the relation between digitalization and internationalization.

Qualitative research uses different methods to collect the data needed such as case studies, focus groups, observations, and interviews. Among these methods, interviews are the most applied method in order to gather qualitative data and information (Bryman et al., 2022, p. 427). In qualitative research, there are two types of interviews, including semi-structured and unstructured. The difference between the two is not significant, however, semi-structured interviews were used in this dissertation due to their advantages. Contrary to unstructured interviews, by which a short list of subject areas is used to gather information, semi-structured interviews benefit from a series of predefined research questions, making this method more goal-oriented (Bryman et al., 2022, p. 427). Moreover, the order of research questions asked during the interview can vary depending on the flow of conversation allowing for flexibility in response by interviewees (Saunders et al., 2016, p. 391). This enables new questions to be also asked if new related aspects are brought in the conversation by interviewees, which provides more details on the subject.

Therefore, unstructured interviews are suitable when there is no knowledge about the subject and an unbiased understanding of the research field is needed; whereas semi-structured interviews are useful when a clear goal is pursued regarding the research subject, and hence the research questions are predefined. On this basis, semi-structured interviews are the right choice for this dissertation, since specific research questions were generated in previous sections and specific research areas are followed to understand the impact of digital technologies on international companies' operations.

Despite the advantages qualitative research through semi-structured interviews is offering, there are also disadvantages and critics about the research approach. First, the approach is known to be often subjective, since the findings rely on the researcher's view; second, the results are difficult to replicate due to the involvement of the researcher and lack of standardized procedure; and finally, the results are difficult to generalize, since qualitative research typically uses a small and often non-representative sample (Bryman et al., 2022, p. 375). Moreover, semi-structured interviews are also believed to demonstrate data quality issues due to reliability and forms of bias (Saunders et al., 2016, p. 396). However, there are techniques in regard to data collection and data analysis in qualitative research helping avoid the above-mentioned critics and ensuring the quality of the research. These techniques will be discussed in details in the following sections.

In conclusion, quantitative and qualitative research approaches are suited to different types of research questions in management studies. While quantitative approach is invaluable for measuring relationships and testing hypotheses, qualitative approach provides tools for an in-depth understanding and contextual insights of organizational behavior and operations. Based on the previously demonstrated research questions and research gaps, therefore, a qualitative approach conducted by semi-structured interviews enables this dissertation to shed light on the existing complex relationships between digital technologies and companies' international activities.

4.1.2 Research Method: Grounded Theory vs. Qualitative Content Analysis

In the field of qualitative research, there are several methods to conduct the study and analyze the gathered data, which make the research structured and increase the quality by standardizing its process. Two of the most applied methods are grounded theory and qualitative content analysis. Both have been considered equivalent in terms of interpreting qualitative data; however, they have unique characteristics, which make them different despite of the similarities. This section discusses both methods and concludes which one should be selected to proceed.

The term grounded theory was first introduced by Glaser and Strauss in the 1960s and is defined as “the discovery of theory from data systematically obtained and analyzed in social research” (Glaser & Strauss, 2017, p. 2). The main intent of the method is to reach a theory “suited to its supposed uses” as opposed to a theory “generated by logical deduction from a priori assumptions” (Glaser & Strauss, 2017, p. 3). It is a general method to systematically generate a theory from conceptualizing data. Various directions and approaches of the method have been developed after the Glaser and Strauss's introduction, however, generating theory from qualitative data remains the main intent of the all directions.

Similar to grounded theory, content analysis has also taken several directions by various authors. In this regard, qualitative content analysis is one of the most applied methods of analyzing content and was developed at the end of 1970s by Philipp Mayring. The method can be defined as “a research method for subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns” (Hsieh & Shannon, 2005, p. 1278). It is a method for extracting the meaning of qualitative data. While grounded theory and qualitative content analysis both attempt to interpret qualitative data through categorization and coding, they apply different procedures, which gives them unique characteristics. Table 4 demonstrates these characteristics and provides a comparison between the two alternatives.

As described above, grounded theory’s goal is to generate a new theory that explains a phenomenon in a specific context. To do this, it attempts to find relationships between all the relevant elements and dimensions of the phenomenon. Therefore, the method is applicable when no theory exists beforehand about the investigated research subject. Moreover, it does not suit for testing an existed theory or knowledge generation based on the existing literature about the subject (Suddaby, 2006, p. 636). To illustrate, Grøgaard et al. (2022) examined how MNCs develop organizational flexibility to deal with increasingly changing strategy pressures over time. They proposed a process model, through which MNCs can achieve the flexibility (p. 641). The process demonstrates how each component of organizational capabilities relates and interacts with other components. The capabilities were selected based on the literature.

In contrast, qualitative content analysis’s goal is to “systematically describe the meaning” of the qualitative data in a certain respect that follows the research questions (Schreier, 2012, p. 3). In fact, the procedure of qualitative content analysis is research question-oriented. Research questions are typically emerging from the research subject and are based on the existing literature, which should be answered after the text analysis. This procedure makes the qualitative content analysis different than grounded theory, which is known for its openness (Mayring, 2019, p. 3). Although both research methods include coding in their process, qualitative content analysis is not intended to find relationships between codes and categories to build a theory, but it rather aims to identify categories from the data, leading to extracting meanings of statements (Cho & Lee, 2014, p. 5). In the above-mentioned example, if the primary objective of the study was to identify the components (organizational capabilities), then qualitative content analysis would be an appropriate research method to extract the components from the qualitative data.

Table 4: Characteristics of Grounded Theory and Qualitative Content Analysis

	Grounded Theory	Qualitative Content Analysis
Similarities	- Based on naturalistic inquiry - Flexibility of using multiple sources of data - Systematic steps in analysis - Seeking themes through coding process - Text to be coded into categories or themes	
Differences	- Constant comparative analysis - Theoretical sampling	- Suitable for inductive and deductive - Allowance for analyzing the manifest or/and latent content meanings
Outcomes	Authors import concepts or themes to re-frame a phenomenon, event, or case (Sandelowski & Barroso, 2003, p. 913)	Covering the data instead of developing a new theory. It remains close to data as given (Sandelowski & Barroso, 2003, p. 908)
Process	1) Theoretical sampling: Collecting data for comparative analysis 2) Open coding: Finding related excerpts in transcripts and group them into codes 3) Axial coding: Group codes into categories 4) Comparing categories and finding relationships 5) Selective coding: Finding the central concept 6) Writing the theory Based on (Glaser & Strauss, 2017)	1) Determining research questions 2) Determining the levels of abstraction 3) Data collection and sampling 4) Choosing between inductive and deductive, and finding categories 5) Rechecking the category system 6) Final working through text 7) Interpretation of results Based on (Mayring, 2022)
Quality Criteria	Overall qualitative research criteria, and rigor in quality of concepts, systematic relatedness among concepts, conceptual density, range of variations and specificity (Corbin & Strauss, 1990, p. 18)	Overall qualitative research criteria such as credibility (internal validity), transferability (external validity), dependability, and confirmability (Welch & Piekkari, 2017, p. 719)
Strengths	- Flexibility and creativity in approach to inquiry - Openness in creating a new theory - Holistic understanding - Well-defined analysis procedure	- Understanding of the meaning of phenomena through verbal or written communication materials - Large quantities of data can be treated - Coding categories can be derived from the data or relevant existing theory or previous research
Weaknesses	- Requires knowledge in exact version of grounded theory approach - Stringent saturation process - Risk of not generating significant theory despite of time and energy devoted - Difficulty in anticipating the research time frame	- Less appropriate for open explorative or descriptive research - Labor-intensive and time-consuming procedure - Less established analysis process

Source: Based on (Cho & Lee, 2014)

Similarly, this dissertation primarily aims to identify the impacts of digital technologies on different types of international business activities. Therefore, qualitative content analysis seems to be the right research method to systematically extract these impacts from the text material based on the research questions. Nevertheless, it should be noted that theory building is also possible in this method, even though this is not its main intention like it is in the grounded theory.

Furthermore, the flexibility of using both deductive and inductive approaches is one of the unique characteristics of qualitative content analysis (Cho & Lee, 2014, p. 4). Deductive approaches are appropriate for testing existing theories and predictions while inductive approaches are suitable for identifying new patterns within the qualitative data. The flexibility enables this dissertation to simultaneously test the afore-mentioned predictions and assumptions in the literature as well as exploring new concepts and peculiarities of digitalization in international companies. This has the highest relevance for this dissertation, since it covers various research questions, some of which are based on the previous studies while the others refer to research gaps in the international business literature. This is contrary to grounded theory, by which no previous theoretical knowledge exists about the research subject.

The next aspect of comparison between the two research methods is their data analysis process. Although both methods have a systematic process, which shares similarities in coding and finding themes, data collection and data analysis are parallel in grounded theory, meaning that the theory and findings emerged from the first interviews influence the selection of the next sample and also the direction of the data analysis (Corbin & Strauss, 2015, p. 135). In contrast, qualitative content analysis is defined by its strict rules and step-by-step procedure (Mayring, 2019, p. 3). This makes the latter method more appropriate for this dissertation because the decision about which sorts of data should be gathered was made based on the research questions and before data collection. The predetermined direction of data collection would require a predetermined process as well for analyzing the gathered data.

More importantly, all codes and statements that appear infrequently will not be considered in grounded theory, since it focuses on relationships among codes and categories. This means that when one specific aspect is mentioned by an interviewee, which may answer one of the research questions, it will be set aside despite its importance. Therefore, the elimination of infrequent codes does not suit the identification of peculiarities of one specific phenomenon or incident. On the other hand, qualitative content analysis considers all the generated codes even if they are not appeared frequently. This makes the qualitative content analysis more relevant for this dissertation with its predetermined research questions.

Despite the above-mentioned arguments, qualitative content analysis represents some weaknesses as well, which should be indicated. The coding process in this method adopts rephrasing and simplifying the coded passages in the text material. This step of the process is designed to bring the passages to a similar language level. However, it increases the risks of losing the main object by wrong interpretations (Kuckartz & Rädiker, 2023, p. 62). Therefore, the researcher needs to pay extra attention to this process. Moreover, transcribed interviews are the main source of data in qualitative content analysis. All other forms of data such as organizational documents, business reports, etc. play the role of additional information or verification of interviewees' statements, whereas the grounded theory considers all forms of the gathered data equally to find every possible relationship between different elements of the research subject in order to generate a theory. This makes qualitative content analysis more restricted in terms of data collection.

In conclusion, grounded theory and qualitative content analysis offer unique characteristics and rigor step-by-step process to analyze qualitative data. In this regard, the latter seems to be more appropriate for the purpose of this dissertation, since it allows the recognition of underlying meaning of statements and hence the identification of specific impacts of digital technologies on companies' international operations. Moreover, its flexibility in using both deductive and inductive approaches together with its research question orientation are also beneficial for this dissertation, since it is intended to answer several predetermined research questions based on the existing literature.

4.2 The Process of Data Collection and Analysis

After reviewing the related literature, determining the research questions, and selecting the research methods, it should be indicated which characteristics the research sample has and how the gathered data was analyzed. In this regard, it will be described how the companies and the interview partners were selected in the first stage. Next, the process of conducting the interviews will be explained. And finally, it will be clarified how the qualitative data was analyzed.

4.2.1 Selection of the Companies under Study

The sampling of a qualitative research occurs theoretically and based on research questions. The aim is to find appropriate representatives for the research subject (Bryman et al., 2022, p. 388). Thus, the companies under the study should be selected according to specific prerequisites representing the research requirements. In this regard, context plays a crucial role in international business studies due to differences in culture, time, geographic, etc. (Poulis et al.,

2013, p. 307). To pay attention to the contexts related to the research subject, the following criteria were considered in selecting the companies. First, the companies need to meet the definition of an international company provided before and be internationally operated, since the research subject encompasses the investigation of international business activities. Second, the sample should include traditional MNCs as well as digital INVs. As discussed earlier, the literature has pointed at differences in “digital” and “going-digital” international companies. Therefore, the inclusion of both company types should help recognize their differences when it goes to the impact of using digital technologies. Third, they must have considerable international presence, through online or physical operations. This includes manufacturing facilities, international partnerships, digital sales and users, corporate offices, or data center hubs in foreign countries. Typically, large MNCs operate in more countries and have more foreign subsidiaries. Such MNCs enable this study to achieve a more comprehensive and generalized view of the research subject. And finally, they should possibly be active in global markets to consider the factor of geographic distance.

The search for such a sample began with German DAX40 companies, since they all fulfill the above-mentioned criteria. For the next round, German DAX100 companies were also added to the list of potential partners for this research project. After acquiring 13 companies from these two lists, the search for one another partner continued. The goal was to acquire a digital company, which was achieved by having a software developer as the 14th company. All the sampled companies are headquartered in Germany, which facilitated the communication with potential interview partners due to the fact that the research was also based in Germany.

Table 5 provides an overview of the companies under study. Their income and number of employees (given in the year, in which the interviews were conducted) represent the size of the companies while the number of countries, in which they operate, should demonstrate the level of their internationality (see section 2.2).

Since interview partners with specific knowledge about the research subject was desired, an impersonal request sent to the potential companies would not be successful. Therefore, a personal and direct approach to the possible interviewees was preferred to reach the identified interview partners within the companies. To this end, interview requests were sent directly to the selected interview partners via email and also by hard-copy mail. The email and postal addresses of the potential interviewees were acquired using online services, including companies’ website.

Table 5: Overview of the Companies under Study

Company	Industry	Income (2022)	Employees (2022)	Active in Countries	Key Markets	R&D in China
1	Automotive	> 125 (bn €)	> 125.000	> 125	China - USA - Germany	Yes
2	Automotive	> 25 (bn €)	> 25.000	> 100	China - USA - Germany	Yes
3	Chemical and Pharmaceutical	> 75 (bn €)	> 100.000	> 75	USA - Germany - China	Yes
4	Transportation and Logistics	> 25 (bn €)	> 10.000	> 125	Europe - Latin America	No
5	Transportation and Logistics	> 5 (bn €)	> 25.000	> 25	Germany - USA - China	Yes
6	Chemical and Pharmaceutical	> 4 (bn €)	> 15.000	> 50	USA - China - Germany	No
7	Automotive and Mechanical Engineering	> 15 (bn €)	> 75.000	> 20	China - USA - Germany	Yes
8	Consumer Goods, Retail, and e-Commerce	> 20 (bn €)	> 50.000	> 10	Germany - Europe	No
9	IT and Online Business	> 1 (bn €)	> 4.000	> 25	Germany - UK - USA	No
10	Insurance and Financial Services	> 150 (bn €)	> 150.000	> 75	Germany - USA - China	No
11	Automotive	> 50 (bn €)	> 75.000	> 100	China - Germany - USA	Yes
12	Consumer Goods, Retail, and e-Commerce	> 5 (bn €)	> 20.000	> 175	Europe - USA - China	Yes
13	Conglomerate	> 50 (bn €)	> 300.000	> 175	USA - Germany - China	Yes
14	IT and Online Business	> 10 (mn €)	> 150	> 150	Europe – USA	No

4.2.2 *Determination of the Interview Partners*

Similar to the selection of sampled companies, important and theoretical criteria played a role in identifying potential interviewees. These criteria include direct involvement in digital transformation of their respective company to provide rich and first-hand knowledge about the use of digital technologies as well as reasonable knowledge about international activities of their respective company. The two criteria imply that interviewees must be in higher level of hierarchy, in other words, top-managers. The reason lies in the fact that such corporate elites are familiar not only with technical aspects of digital technologies, but also with strategy-related issues of employing them for business purposes. Moreover, top-managers typically have a comprehensive view of their company's activities across its GVC. This selection is in line with purposive sampling as the most common sampling method, by which those informants are desired, who have the best knowledge about the research subject (Elo et al., 2014, p. 4).

Therefore, the focus was on the identification of chief digital officers, chief information officers, chief technology officers, or a top-manager, who is directly responsible for the digitalization in one of the potential sampled companies. Such corporate elites play a crucial role in international business research and increase the quality of the data (Welch et al., 2002, p. 612). After several attempts, 14 interview partners agreed to participate in the research. The acquisition of more interviews was not useful, since it was realized during the last interviews that no significant further new information was being added to the collected data and hence, the theoretical saturation was reached (Bowen, 2008, p. 140). Table 6 provides the list of interviewees and their position in their respective company. In this regard, company 1 represents the interview 1, company 2 is associated with the interview 2, and so on.

As mentioned before, potential informants were contacted directly. Direct and personal contact has several advantages, including flexibility in selection of interview partners, less need for coordination within a company to identify the appropriate interviewees, and direct coordination of time availability. This was helpful due to the position of the interviewees as corporate elites and especially in three cases, by which the interviewees were executive board members at the time of the study and hence, direct contacts eliminated the need for coordinators within the companies.

Table 6: Overview of the Participating Interview Partners

Company	Industry	Position of Interviewee	Interview Language	Interview Duration
1	Automotive	Head of digital product strategy and strategic cooperation	German	70 min
2	Automotive	Head of digital strategy	German	35 min
3	Chemical and Pharmaceutical	Vice president digitalization of businesses	German	65 min
4	Transportation and Logistics	Chief digital officer, managing director	English	75 min
5	Transportation and Logistics	Responsible for digitalization department, managing director	English	30 min
6	Chemical and Pharmaceutical	Chief information officer, managing director	English	60 min
7	Automotive and Mechanical Engineering	Chief information officer	English	60 min
8	Consumer Goods, Retail, and e-Commerce	Chief digital officer	English	60 min
9	IT and Online Business	Chief development officer	English	60 min
10	Insurance and Financial Services	Chief information officer	English	60 min
11	Automotive	Head of IT international	English	60 min
12	Consumer Goods, Retail, and e-Commerce	Chief information officer	English	30 min
13	Conglomerate	Head of IT governance and strategy	English	60 min
14	IT and Online Business	Chief technology officer	English	60 min

4.2.3 *Conducting the Interviews*

The main data source of the empirical part of this dissertation is the qualitative interviews conducted with interview participants at HQ. To this end, an interview guide was designed to cover the predetermined research questions, reflecting the four research categories previously demonstrated in section 3.2 as the conceptual framework. More specifically, the interview guide was divided into five parts. Initially, a short introduction to the research topic and its aims was provided after a short greeting (Ghauri et al., 2020, p. 121). A detailed introduction was not needed, since the interview partners as top-managers of well-known international companies had considerable exposure on online media. Moreover, the research topic and its aims were also described prior to the interview and by the first contact to interviewees. The second part was focused on questions about the impact of digital technologies on location of activities. It was followed by the third part, which intended to discuss internationalization-specific decisions influenced by the use of digital technologies. The fourth part asked interviewees about the potential change in the role of foreign subsidiaries in the digital era, while the last part explored how digitalization affects coordination and management of international activities.

Open-ended questions are typically used when data is collected primarily through interviews (Hsieh & Shannon, 2005, p. 1281). As such the interview guide included open-ended questions to ensure that informants have the flexibility to comment on aspects, which they find important. Accordingly, follow-up questions were asked if the informant led to a new aspect or one of the other research categories. This means that the order of questions varied depending on the information provided during the interviews (Bryman et al., 2022, p. 439). This implies the learning effect associated with qualitative research, by which researchers adapt their knowledge of existing theory and biases to the provided information (Bluhm et al., 2011, p. 1871).

All interviews were conducted using online video conferencing services. Due to the increasing worldwide acceptance of such services, interviewees were very experienced and open in this regard. The use of video conferencing as an alternative for face-to-face interviews has the advantages of ease of use, cost reduction due to elimination of travel, and data management features (Archibald et al., 2019, pp. 5–6). Regarding the latter, informants were especially able to provide additional information by accessing documents on their work device during the interview and sharing them on the screen.

Data collection started in March 2022 and ended in February 2024. The first three interviews were conducted in German while the rest was held in English. Each interview lasted between 30 and 75 minutes and depended on the time availability of the informants, resulting in the total

of 785 minutes and the average of 56 minutes. In 12 interviews, informants were asked questions by two interviewers, the author and the supervisor of the dissertation project. At the beginning of each interview, anonymous analysis of the statements was assured while asking interviewees the consent for recording the interviews. Except for only one interview, the permission was given to record the interviews. For the one interview without the permission for recording, which lasted 30 minutes, very detailed notes were taken both during and immediately after the interview to ensure capturing the interviewee's exact statements. Finally, all the recorded interviews were transcribed to make repeated review and analysis of the content possible.

4.2.4 Analysis of the Interview Material

This dissertation builds on several sources of data. The transcribed semi-structured interviews with top-managers are the main source of data to analyze while archival data was also added to the analysis, including press articles, company presentations, and annual reports. In total, 115 of such sources were collected, from which 74 documents were recognized as relevant for the analysis. Such organizational documents are especially important for management studies due to the extent of information they provide about most companies and the insights they give about managerial decisions (Bryman et al., 2022, p. 494), especially that many of these documents are publicly available.

As discussed in section 4.1.2, qualitative content analysis was selected to analyze the data. Consequently, the procedure proposed by Philipp Mayring was adapted for this purpose. However, this procedure is highly dependent on paraphrasing the informants' statements, which has been the subject of much debate due to its associated risks. The simplification of the qualitative material through paraphrasing can result in the conflicting statements being overlooked despite of their importance, clarifying phrases being eliminated, and more complex connections between statements and sub-categories being lost (Kuckartz & Rädiker, 2023, p. 62). Therefore, paraphrasing was avoided in this dissertation to ensure that the resulted interpretation remains close to the interviewees' perspectives. In this regard, Mayring (2022) acknowledges the risks and introduces an alternative procedure for inductive category building, which excludes the paraphrasing and is similar to Kuckartz's (2014) and Schreier's (2012) approaches. The procedure includes eight steps: 1) determining research questions, 2) establishment of a selection criterion, 3) working through the material line-by-line, 4) revision of the categories, 5) final working through the material, 6) building of main categories, 7) intra/intercoder agreement check, and 8) final results (Mayring, 2022, p. 82).

Going through this procedure, the related statements were bundled and integrated with one another based on the selection criteria (level of abstraction) to build categories. In this regard, it is crucial to continuously consider the research questions and the theoretical background, since inductive category building requires theoretical sensitivity (Kuckartz & Rädiker, 2023, p. 59). After completing the first three interviews, the emerged codes and categories were revised and the final category system was developed by analyzing the rest of the material. For retesting the category system (Mayring, 2022, p. 84), all the assigned codes were once again reevaluated three months after the first assignment, by which refinements were taken to the classification of the codes. At the end, several sub-categories were combined or organized into a smaller number of categories based on relationships between them (Hsieh & Shannon, 2005, p. 1279).

The process was followed by adding the archival data to the analysis. These documents were then analyzed deductively. In such deductive categorization, the aim is to “filter out particular aspects of the material” or “give a cross-section through the material according to predetermined ordering criteria” (Mayring, 2022, p. 74). Since the category system was already developed at this stage, the process included the coding of the archival data and revising the assigned codes.

Categories play an important role in the qualitative content analysis. They represent the meaning of included aspects within the text and assigned to the category, which makes text evaluation confined to the developed category system (Mayring, 2019, p. 3). Accordingly, the results will be presented using the developed category system in the next chapter. Nevertheless, the previously introduced four research groups of “location of activities”, “internationalization-specific decision-making”, “foreign subsidiaries and their roles”, and “governance, management, and coordination” will be used only as a framework (and not as inductively developed categories) to showcase and discuss the inductively developed categories. The reason lies in the fact that research questions were categorized under these four groups, which cover the main aspects of the research subject.

As the technical aid for the above-mentioned procedure, the software MAXQDA was used. The main advantage of using computer-assisted qualitative data analysis is that the codes will be linked to the selected text and will be recoded into the category system (Kuckartz, 2014, p. 133). This enables the codes to be reorganized or resorted later during the analysis. The computer-assisted analysis also facilitates the identification of quantitative characteristics of the data, such as the frequency of words or statements by different informants (Kuckartz, 2014, p. 148), which may indicate the specific importance of frequently mentioned aspects. Despite the possibility,

the frequency check was not vastly applied during the analysis, since the general mention of information and content-related statements are more relevant for the evaluation of qualitative data.

And finally, the theories and theoretical background discussed in chapter 2 and 3 were used again to interpret the findings. Both conflicting and supporting literature was considered in order to strengthen the validity of the identified categories and improve their generalizability in compliance to the international business literature.

4.3 Evaluation Criteria for Qualitative Research

Similar to quantitative research, it is also important to ensure the quality of qualitative research based on various criteria. Reliability and objectivity have been fundamental criteria for demonstrating the quality of quantitative methods. However, the role of these criteria is blurred in qualitative research due to its nature. Instead, trustworthiness and validity are considered as alternative concerns for this purpose, which include credibility, transferability, dependability, and confirmability (Kuckartz, 2014, p. 152). These criteria should be considered for the preparation phase as well as during the data collection and data analysis.

To ensure the validity for the preparation phase and the research design, it is important that the study is derived from established theories in the literature and encompasses semi-developed conceptual structures, which increase the credibility and transferability of the research (Sinkovics et al., 2008, pp. 700–702). To this end, several relevant theories and concepts were used and a conceptual framework was developed based on the existing theories and assumptions in the international business literature, which also inspired the research questions determined for this research project. Moreover, the selection of the companies and interviewees was based on theoretical aspects, as described before, which again enhances the transferability of the qualitative research.

Regarding the validity of data collection, measures can be implemented to ensure that the interviewer is optimally prepared, such as developing an interview guide, which can be adapted before the start of each interview (Bryman et al., 2022, p. 430). This was done in this research project. Moreover, an experienced second interviewer, as mentioned before, was present at most of the conducted interviews, which enabled the interview guide to be further refined and its sufficiency to be tested. The presence of the experienced interviewer had also the advantage of eliminating the need for test-interviews at the beginning of the data collection to train the interviewer.

Furthermore, various measures can be considered in order to encourage the openness of informants, which can result in richer information gathered about the research subject. In this regard, informants can be informed about the research aims prior and during the interviews, confidentiality of collected data can be assured, and an atmosphere of trust can be created (Ghauri et al., 2020, p. 121). To this end, the interviewees were provided with detailed information about the purpose of the study in the initial contact as well as a short explanation at the beginning of each interview. In one case, where the interviewee was not sure if he can help the project despite the provided information, an online meeting was coordinated prior to the main interview to describe the research aspects and the relevance of his position for the project. This increased his trust and resulted in his acceptance for being interviewed. In addition, prior and at the beginning of the interviews, the informants were assured about the anonymity of data evaluation. Finally, the atmosphere of trust was created by interviewees having the opportunity to participate in the interviews at their desired time and place. During the interviews, the interviewees were either at their workplace or in other familiar surroundings. In general, these measures describe how participants were communicated and treated, which enhances the confirmability of the research (Sinkovics et al., 2008, p. 697).

In terms of validity of data analysis, it is crucial to evaluate the collected data systematically. Indeed, the use of a specific method with systematic approaches increases the trustworthiness of the research (Hsieh & Shannon, 2005, p. 1286). The qualitative content analysis applied in this research project as a rule-based approach ensures that the material is processed systematically. The reason lies in the fact that all relevant data was taken into account, a sequence of steps was followed, and the consistency of coding was tested (Schreier, 2012, pp. 34–35). Moreover, the use of the implemented method was thoroughly documented for the preparation phase as well as during the data collection and data analysis, which again increases the trustworthiness (Elo et al., 2014, p. 8). This documentation was explained in previous sections and will be further referenced in the next chapter.

Furthermore, the use of the software MAXQDA facilitated the analysis of the text materials, and hence enhanced credibility. Such a computer-assisted analysis enables storing of textual and non-textual materials in different languages, which is crucial for studies in international business (Sinkovics et al., 2008, p. 709). In addition, the use of protocols, memos, and visualizations in the software fostered the interpretation of the results. Consequently, the software-based analysis enhances the transparency of the research process, contributing to the quality of this research project (Sinkovics et al., 2008, p. 709).

The evaluation of qualitative data is associated with interpretations. These interpretations are to be conclusively argued to illustrate interpretation safeguards (Mayring, 2022, p. 175), and hence their validity. To this end, the interpretations of the collected data were coherently justified and thoroughly confronted with the theories used. The fulfilment of this quality criterion is achieved by the illustration of the connection between the afore-mentioned theories and the respective interpretation during the discussion in the next chapter. The providing of this explanation is crucial to enable the evaluation of trustworthiness (Elo et al., 2014, p. 8), and enhance transferability and confirmability of the research (Sinkovics et al., 2008, pp. 697–698).

Another measure to increase the validity of data evaluation is communicative validation, whereby the findings will be presented and discussed again together with interview partners (Mayring, 2014, p. 111). This procedure was not pursued in this dissertation due to the following reasons. First, the research project is primarily aimed at exploratively identifying objective aspects of deploying digital technologies in international companies through finding themes and patterns from the transcribed interviews. Therefore, the discussion of each transcript separately with its corresponding interviewee without considering other transcripts was unlikely to verify themes and patterns. Moreover, the arrangement of another personal appointment with the interview partners would be very difficult due to their position as high-ranked managers. Also, a time-consuming further engagement with transcripts would be unlikely to be accepted by the interview partners.

The last criterion to examine the validity of the research is the concept of triangulation. This implies the use of different data sources, methods, theories, and interpreters to address the research questions (Natow, 2020, pp. 161–162). The strategy of using triangulation leads to more diverse perspectives on the research subject (Kuckartz, 2014, p. 155). In terms of data sources, different types of documents were added to the analysis in addition to the interview transcripts, as the most common triangulation technique applied when interviewing corporate elites (Natow, 2020, p. 169). This enhanced the analysis by comparing informants' statements with information stemming from archival data, such as company reports or press articles. However, the use of multiple methods was not followed, since the applied method of semi-structured interviews was already useful to identify the peculiarities of digitalization in international companies. Nevertheless, it would certainly be a further possibility to conduct follow-up quantitative studies in order to enhance the results with a larger sample. In terms of applied theories, various digitalization-related and international management-related theories and concepts were put against the findings to increase the validity of interpretations. Finally, the triangulation in

using different interpreters was achieved partially through the presence of two interviewers and the exchange of the research's aspects with the supervisor of the research project, colleagues, and other researchers.

In conclusion, it was attempted to adopt the evaluation criteria of qualitative research in order to increase the trustworthiness and validity. Measures such as systematic data analysis, and communicative validation were applied to enhance the credibility. On the other hand, argumentative interpretation together with thick description in the next chapter will assure the transferability of findings. Moreover, using an interview protocol as well as the number of interviews are associated with dependability while the triangulation reflects the confirmability of the research (Welch & Piekkari, 2017, p. 719). These evaluation criteria should support the research results and assure the transparency of research procedure. When these four quality criteria are properly addressed during the initial phase, research design, data collection, data analysis, and the discussion of the results, then the trustworthiness of the qualitative research is assured (Sinkovics et al., 2008, p. 709) and the transparency of the research reports is enhanced.

5 Results of the Empirical Study

The previous chapter described how the data was collected and analyzed using the selected research method. This chapter then presents the results of the analysis. To this end, each peculiarity founded in the text material and related to the research questions will be discussed extensively, while a comparison of the findings with the relevant literature will also be provided.

5.1 Category-based Discussion of the Results

This section is designed to reflect the code system inductively emerged from the qualitative data. Figure 3 illustrates the code system. To answer the four research questions introduced previously, the codes will be explained under four categories, each of which represents one of the four research questions. Moreover, two further themes stemmed from the text material referring to “political circumstances and regulatory requirements” and “ecosystems and digital platforms”. It is important to note that both themes can impact international activities of companies in a broad spectrum and have indeed connections with each of the main four categories. Due to this connection with other research categories, the role of the two themes will be explained during the discussion of other codes under each category, where their impact is relevant.

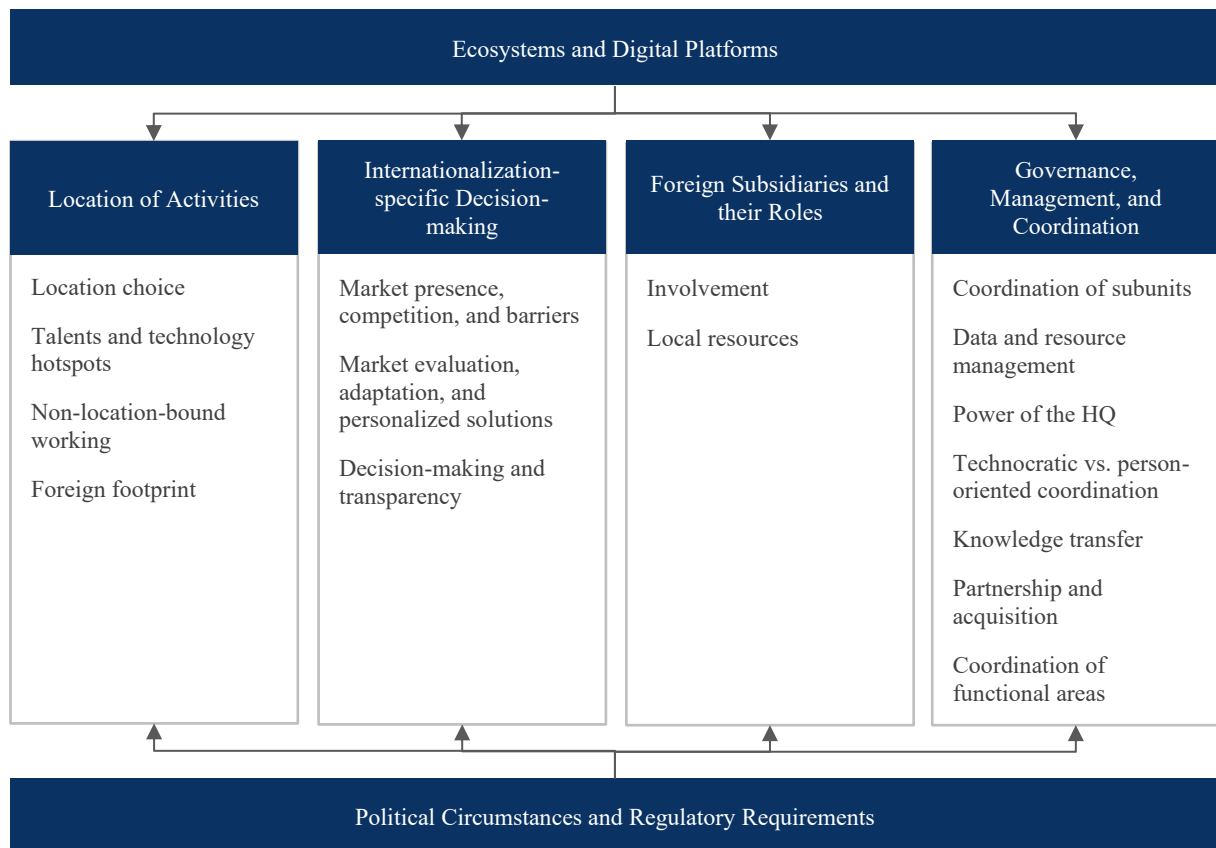


Figure 3: Code System emerged from the Text Material

Before beginning the discussion of the first category in the code system, several general aspects about using digital technologies in companies need to be explained. These aspects are mostly concerned with digitalization-related goals and strategies, which were stressed by the interviewees. As discussed in section 2.1.2, companies need to determine business targets and corporate objectives of deploying digital technologies before beginning with digitalizing business processes. In this regard, one could argue that the goal of deploying digital technologies is to generate revenue by offering innovative products and services. Especially, when it is considered that MNCs are operating in different markets, digital technologies can help them increase their revenue in foreign markets by providing local customers with innovation. However, most of the interviewees underlined “efficiency” as the primary goal alongside cost reduction and quality improvements (Interview 1, para. 6; Interview 3, para. 2; Interview 4, para. 4; Interview 10, para. 20; Interview 11, para. 69; Interview 12, para. 79; Interview 14, para. 90).

One of the ways to increase efficiency is automation, which enables companies to optimize repetitive tasks by standardizing processes (Interview 8, para. 2; Interview 13, para. 11). In this respect, automation means to let machines take over human tasks (Raisch & Krakowski, 2021, p. 192). By handing over routine tasks to machines, companies can then optimize productivity and reduce costs (Interview 10, para. 56). In this regard, MNCs can increase the efficiency of their cross-border activities by automating routine tasks, for example, AI-based customer services in different locations and languages (Interview 4, para. 2), or using robots in production. Such solutions are crucial for MNCs, since they can replace humans with robots, and hence influence location choices due to elimination of human factor.

Nevertheless, not all types of activities can be automated. For instance, the above-mentioned AI-based chatbots have their own limitations and cannot replace humans in all customer-related conversations (Interview 1, para. 32). This hinders traditional manufacturers from relying extensively on digital tools and forces them to still have a considerable presence in foreign markets, suggesting that in many cases cooperation between humans and machines is needed, which is understood as augmentation (Raisch & Krakowski, 2021, p. 192). The augmentation also helps increase efficiency, especially in production, where physically demanding tasks can be conducted by robots, which let employees to work alongside them without safety issues (Report 29, Company 1, 2015, para. 4)², meaning that automation technologies and robots are aimed at

² As described in the previous chapter, 74 external documents, from annual reports to press articles, were analyzed alongside the 14 interviews. To simplify the citation, all these documents are numbered and named as “report”. This is followed by the company, to which the report is relevant and the year, in which the report is published.

complementing employees rather than replacing them (Interview 1, para. 6). This has then implications for MNCs. Since manufacturing hubs such as China are increasingly employing robots in production, Western MNCs can increase the efficiency in those locations by connecting automated tasks with other tasks conducted by humans.

Furthermore, digitalization-related strategies of MNCs need to be paid attention. To this end, a key aspect refers to a fundamental strategic choice between internal development of digital solutions or relying on external partnerships to acquire such solutions. This is critical due to the expertise that well-known technology companies such as Google or Microsoft have in their field, which can help non-technology-based companies to remain competitive (Interview 1, para. 1). The relevance of the above-mentioned choice for MNCs relies behind its impact on their international presence and how they organize their GVC activities, since they need to decide on central development of digital solutions in the HQ or establishing their presence in foreign countries in order to access specific technologies (Interview 7, para. 33).

The development of effective digital strategies is also intertwined with MNCs' organizational culture and corporate history. Obviously, digital transformation is tied with changes in organizational structures and business processes. In this regard, resistance to change is a common cultural barrier that can impede the implementation of digital technologies. As an illustration, there is often a conservative approach to technology adoption in traditional industries, where many employees prefer long-established methods and not consider the overall benefits of digitalization for the company (Interview 5, para. 33). This cultural resistance is even more challenging in large MNCs with many thousands of employees who may not be interested in digital tools (Interview 7, para. 23), especially that such MNCs are typically operating in different countries and are facing with different cultures. This makes training and educating employees a crucial aspect of digital transformation, which should be considered by companies while developing digital strategies (Interview 4, para. 16).

In contrast to the above-mentioned resistance, employees in specific countries are more affine with digital tools. For instance, the reliance on WeChat in China instead of email (Interview 13, para. 65) hints at differences in communication norms, which require that MNCs adjust their digital efforts to be locally appropriate. Such an approach enables MNCs to engage their employees in the development of digital solutions and encourage them to participate in digital transformation of the company.

Overall, goals of using digital technologies and their associated strategies play an important role in understanding the main discussion in the following sections. In this regard, digitalizing and standardizing international business processes help MNCs increase efficiency and reduce costs. Moreover, digital strategies need to be carefully adapted to variations in digital infrastructure and cultural differences. The success of digital transformation depends not only on technological solutions, but also on the ability of MNCs to engage their global employees, consider local market characteristics, and find a balance between internal development and external acquirement of digital solutions.

5.1.1 Location of Activities

The location of activities refers to those aspects that are related to the locus of international activities. In this regard, the focus is on where MNCs locate their GVC activities and how digital technologies affect this process. As illustrated in figure 3, the analysis of the text material hinted at several aspects, including location choice, talents and technology hotspots, non-location-bound working, and foreign footprint. Each aspect will be explained in details in the following sections.

5.1.1.1 Location Choice

The location of value chain activities is particularly important for MNCs. Cost, availability of resources, and geopolitical reasons have been among the factors of deciding where each component of the value chain should be located. In addition to these traditional factors, digital technologies may also alter how international companies strategize the locus of their cross-border operations. Specifically, technologies such as 3D printing can encourage MNCs to rethink their location choices in regard to production. Moreover, digital connectivity can foster a fragmented GVC, which may also influence location choices. Thus, digitalization has the potential to lead to a reconfiguration of value chain activities.

According to the interviewees, production remains a cornerstone of GVCs and the decision on its location depends more on traditional factors than the digitalization. Digital technologies may offer operational advantages, but their role in determining where to put production is secondary to economic and geopolitical considerations. Key factors include proximity to suppliers and customers, cost efficiency, and the stability of the surrounding business environment. In this regard, MNCs still choose low-wage countries for production, a trend largely unchanged despite advances in automation and robotics.

Digitalization and digital technologies are not the main drivers for the location of a production network. Rather, it is still more like: you have to have the supply chain under control, you have to look at it geopolitically. [...] We are still building and other manufacturers and large companies are also building in low-wage countries, in relation to the production location (Interview 1, para. 6).³

Also echoed by the interviewees 3, 6, and 7, manufacturing companies continue to prioritize cost and supply chain control over digitalization. As an illustration, Company 7 is an automotive supplier which followed its largest client in the late 1950s and established its first manufacturing plant outside of Europe near its client's plant. The proximity to customers remains as the main factor of location choices in production for the company rather than digital advancements (Interview 7, para. 3). Similarly, in industries with heavy capital investment, digital tools do not fundamentally alter the choice of location. While digitalization supports operational efficiency, it rarely outweighs traditional factors such as logistics, access to raw materials, and geopolitical considerations in these sectors.

Nevertheless, digitalization may sometimes influence the locus of production indirectly. For instance, Company 6 established its manufacturing presence in Sweden following the acquisition of a small company with niche digital expertise in the country; however, such value chain positioning based on digital technologies remains outside of the company's strategic development (Interview 6, para. 2), highlighting that such cases are exceptions rather than the norm in production-focused decision-making.

Despite the digitalization not being seen as an influential factor of location choices in production, digital technologies provide an increased level of flexibility in such decisions.

It's not anymore like maybe twenty years ago when we always said: OK, let's focus or let's concentrate a certain activity in a certain location that might be best cost country, so something like that. We feel like we are more flexible now in order to do activities where we find the right people for it (Interview 5, para. 2).

One reason for this flexibility is the extent of data gathered through international operations, which gives international companies clearer insights and makes decisions more data-driven

³ Original Quotation in German: Für den Standort eines Produktionsnetzwerks ist Digitalisierung und digitale Technologien nicht der Haupttreiber. Vielmehr ist es eher immer noch: du musst die Lieferkette unter Kontrolle haben, du musst geopolitisch schauen. [...] Wir bauen immer noch und auch andere Hersteller und große Unternehmen bauen in Niedriglohnländern, bezogen auf den Produktionsstandort.

(Interview 4, para. 6). Moreover, digital connectivity enables MNCs to link their GVC activities, including manufacturing sites, which results in certain flexibility in regard to location choices (Interview 7, para. 3).

The flexibility increases even more in other functional areas, where there is less need for physical presence in host countries, such as accounting. For instance, Company 8 has concentrated its accounting tasks in Spain due to the existence of expertise in the country (Interview 8, para. 8). Similarly, Company 7 has pooled its supporting functions such as human resource management or logistics in different countries (Interview 7, para. 3).

And we do have some other let's say focus areas where we say this [location] is maybe our logistics cluster where there is maybe the team, the HQ [are] located. So, that definitely is much more flexible because of the technology that you see how people can communicate and also how information is provided (Interview 8, para. 8).

A compelling example of such flexibility in production was provided by interviewee 11. Particularly, Company 11 is building different product models from its own and other brands in one specific location. This is possible due to automated tasks in assembly lines, which make the coordination and planning of such a complicated production easier (Interview 11, para. 8). Without digital solutions, Company 11 would need to establish assembly lines for each of the product models that it currently produces, which would probably require several manufacturing sites at different locations. This means that digitalization has provided the company with a certain level of flexibility, even though the decision for the establishment of a manufacturing site in the above-mentioned location was not primarily influenced by digital technologies.

In conclusion, the influence of digitalization on location choices varies across different value chain activities. In production, its role is limited, mainly reinforcing existing strategies. In contrast, other functional areas such as accounting or human resource management are likely to benefit more from the flexibility provided by the extensive connectivity stemming from digitalization. Flexibility emerges as a unifying theme, with digital tools enabling companies to transcend traditional constraints and operate with greater adaptability.

The result suggests that location advantages, such as low-cost labor, still play a crucial role in location choices and digital technologies have not yet been able to change this role significantly despite the increasingly connected production systems in the contemporary international business. Moreover, the discussion of reshoring in the literature due to digitalization does not seem

to be a norm among large MNCs. The results indicate that industry 4.0 and its related technologies, such as automation and additive manufacturing, may offer operational flexibility, it has not however changed the importance of cost factors as the primary driver of offshoring and the encouragement for Western companies to reshore, as expected in the literature (Ancarani et al., 2019, p. 367; Strange & Zucchella, 2017, p. 178). The reason may lie behind the requirement for a highly automated production system in order to decouple labor from the process and make offshoring less attractive (Butollo, 2021, p. 264), which is not yet possible. In this regard, one of the interviewees hinted at discussions in the company to reshore some activities including production; however, security issues were mentioned as reasons and the role of automation in such decisions was denied (Interview 11, para. 4).

The position of the company in the GVC also plays an important role in reshoring; for suppliers, proximity to key clients is an essential factor (Dachs et al., 2019, p. 10). This means that the reshoring strategy of such companies follows that of their clients and is less related to digitalization. This was confirmed by the results, since Company 7 as a supplier prioritizes such proximity and sees digital technologies less relevant for this matter (Interview 7, para. 3).

Nevertheless, digitalization can affect location choices when the role of human capital is considered. Lewin et al. (2009) suggested that in the IT-enabled business environments, MNCs relocate functional areas to where the necessary human capital can be found rather than the human capital migrating to where MNCs are located (p. 921). The flexibility resulted from digitalization and discussed in this section facilitates such relocations and highlights the importance of decentralized and fragmented GVCs in the digital era. As seen by the interviewed companies, they increasingly concentrate their functional areas in different locations around the world, where they can find talents in regard to their targeted functions, creating a geographically dispersed value chain. Such a fragmentation is possible due to the digital connectivity between different components of the GVC, which enables co-working and co-specializing between business areas of an MNC.

The result can also be explained with the concept of global integration-local responsiveness. Since the paradigm is applicable at the level of functions and subfunctions, MNCs can decide accordingly and locate different functions at different countries. Such a concentration of functions helps companies benefit from talent pools and globalize specific business areas such as accounting. Digital technologies then facilitate the coordination and management of activities between the dispersed value chain components. On the other hand, functions such as logistics

may still need to be localized. Overall, it seems that digitalization provides more flexibility in conducting such a fragmentation in GVCs.

5.1.1.2 Talents and Technology Hotspots

As outlined in previous sections, digital talents and IT professionals play a crucial role in the digital era due to the extensive use of digital technologies. In this regard, international companies need to identify such talents and the locations in which they are to be found. As a result, technology hotspots have become essential components of the international business landscape due to their high concentration of technology-driven activities. Nevertheless, these hotspots are more than geographical centers. They are typically characterized by advanced infrastructure and educational institutions, which enable them to attract, cultivate, and retain expertise in advanced technologies. For international companies, leveraging such technology hubs offers strategic advantages in talent acquisition, cost management, and innovation.

Silicon Valley has been known as one of the prominent technology hubs for a long time. With the increased digitalization efforts of countries, however, new cities have established themselves as capable of providing IT professionals with unique digitalization-related skills. To this end, not only does educational infrastructure such as universities and research institutions play an important role, but also governmental support in form of subsidies and incentives (Interview 7, para. 9; Interview 13, para. 11; Report 53, Company 2, 2023, para. 4). Moreover, political stability and economic volatility are also important factors. As an example, mentioned by one of the interviewees, Turkey offers a relatively educated workforce, but is subject to economic instability and high inflation, making it a less attractive option for long-term investments (Interview 8, para. 12).

Understandably, international companies are in search of technology hubs where the likelihood of finding high-skilled IT professionals is higher compared to other places. These hubs seem to be more diverse than before with several countries and cities around the world selected by the interviewed companies as the location, in which they are searching for digital talents. These mostly include Silicon Valley (USA), Shanghai (China), Berlin (Germany), Pune (India), Barcelona (Spain), Lisbon (Portugal), Warsaw (Poland), and Budapest (Hungary); with few interviewees also hinting at Mexico, Brazil, Vietnam, and Singapore. Other places, such as South Africa, were not common choices among the interviewed companies.

At the beginning of the 2000s, Company 1 decided to open what it called Tech Offices, the first in Silicon Valley, of course, then one in Shanghai, and more recently in South

Africa and Portugal. This has been done for years, but has been intensified significantly in the last few years because the topics being researched there are becoming increasingly relevant to business success (Interview 1, para. 8).⁴

While some of the above-mentioned cities and countries have been already known as technology hubs, the other locations are less known and indeed surprising. For instance, one could not imagine that Singapore and Vietnam can offer high-skilled digital talent pools. However, both are among the new countries pushing strategically towards digitalization and creating an ecosystem conducive to digital talent, which have gained international companies' attention (Interview 7, para. 9; Interview 9, para. 22; Report 68, Company 7, 2022, para. 1). Moreover, countries in Eastern Europe have become integrated in MNCs' GVC due to their low-cost labor. It is surprising that these countries are receiving attention also in regard to IT development. Probably, the most surprising name mentioned by many interviewees is Lisbon in Portugal. The reason lies in the fact that the city has only recently started to be recognized as a technology hub.

India always was, in India, it was always like the idea with the hub. But the whole Lisbon topic, it really gained importance in the last two to three years. And Lisbon is really running well. We have from an IT and cyber security perspective I think 700 people over there, which are really supporting [our business processes] all over Europe together there. And this is because of talent, because of talent supply. This has to do something with the universities that are there, with the skilling that is there, they all have very good English. Also, the cultural difference is not too far away from a very core German-manufacturing-like type of business (Interview 13, para. 11).

As quoted above and highlighted by other interviewees, several factors play a role in choosing specific technology hubs by international companies. These factors include availability of talent, cost efficiency, competition, and cultural and proximity considerations.

Talent is a foundational pillar for choosing technology hotspots. International companies seek locations with a pool of skilled IT professionals. This is critical because IT-related competences are scarce and companies are lacking such competences.

⁴ Original Quotation in German: Anfang der 2000er Jahre hat man sich bei Unternehmen 1 entschieden, die sogenannten Tech Offices aufzumachen, natürlich klassisch das erste im Silicon Valley, eins dann in Shanghai und neuerdings auch nochmal in Südafrika und Portugal. Das hat man schon seit Jahren gemacht, aber jetzt seit ein paar Jahren deutlich intensiviert, weil die Thematik, die dort erforscht wird, auch immer relevanter für den Geschäftserfolg wird.

As everywhere in the world, we are lacking IT technology competence and we need to go where the competences are. So, competence is one criterion ... (Interview 11, para. 60).

The importance of IT competence relies in the fact that more and more digital services such as AI-based solutions and connected processes are being integrated into not only business processes of international companies, but also their core products and customer services. Due to the extensive utilization of such solutions, their development requires a vast amount of highly skilled IT professionals, which cannot be found adequately in every location around the world. Therefore, specific locations which can offer a pool of digital expertise, become interesting for international companies.

Furthermore, international companies may follow the strategic specialization of technology hubs based on the unique advantages of each location. The reason lies in the fact that certain countries or hubs have certain digital capabilities (Interview 3, para. 6; Interview 8, para. 8; Interview 11, para. 12; Interview 14, para. 20; Report 68, Company 7, 2022, para. 2). For instance, many interviewees indicated that they locate their customer service development in India or Spain. On the other hand, AI-based solutions tend to be developed in Silicon Valley or Shanghai, where sufficient digital expertise exists for it.

We are already putting a certain focus on our digital hubs and in the hubs also on certain technologies. We say: OK, we will do topic X primarily in Madrid, or topic Y, we see that we are getting less talent in Kuala Lumpur, so there, we will focus on something else (Interview 3, para. 2).⁵

This approach can go as far as developing core product-related digital solutions in one location and spreading it across other products and global markets. This is specifically the case in China due to its remarkable competence in digital technologies. Historically seen as a market primarily for localization, China has transformed into a global technology hub, pivoting strategies of European MNCs from the traditional “China for China” to “China for the World” (Interview 1, para. 8; Interview 11, para. 54).

Such fragmentation in IT development enables international companies to exploit the available talent in each region. In this regard, MNCs can benefit from their already existed global network

⁵ Original Quotation in German: Wir setzen schon einen bestimmten Fokus auf unsere digitalen Hübte und in den Hübten auch auf bestimmte Technologien. Wir sagen: Okay, das Thema X machen wir primär in Madrid eher, oder das Thema Y, da sehen wir, da kriegen wir weniger Talente in Kuala Lumpur, da fokussieren wir dann auf etwas anderes.

to integrate this fragmented development of digital technologies. To illustrate, many traditional MNCs have subsidiaries in China. This makes it easier for them to establish new hubs in Shanghai and exploit the digital expertise. In contrast, smaller companies and especially INVs may find it difficult to do the same without an established global footprint.

Labor cost is also a prominent criterion for international companies to choose between available technology hubs. This explains India, Spain, and the countries in Eastern Europe being selected by international companies as favorable destinations for IT development, which was indicated as an important reason by almost all of the interviewees. Investments in such regions not only reduce operational expenses, but also allow companies to scale their digitalization efforts, since they need more and more IT professionals. The following quotation summarizes all other interviewees' statements in this regard.

When we go to hotspots, we have a big IT company in India, offshore. We have started to create software development centers in Lisbon, in Barcelona, so where we have... or Hungary, where we have low labor costs (Interview 11, para. 60).

This suggests that similar to the MNCs' traditional tendency to go to emerging countries due to lower labor costs in production, they are likely to follow the same strategy in regard to IT development due to the importance and relevance of digital technologies in today's business landscape. Such an approach is especially crucial for smaller companies or those MNCs with the core business less dependent on advanced technologies in order to increase their cost efficiency, since IT-related wages are significantly higher in places like Silicon Valley, making acquisition of very high-skilled talents in such places unaffordable for them (Interview 6, para. 4; Interview 14, para. 24).

More importantly, the evolving economic landscape necessitates reassessment of cost structures in the above-mentioned technology hotspots. For instance, India and Portugal now face rising wages, making them less attractive than before for international companies in terms of labor cost. The reason lies behind the fierce competition in those locations. When one specific technology hotspot becomes popular, many international companies aim to benefit from the talent pool, which obviously raises the demand for digital talents and hence the wages. This effect will be intensified by the presence of larger MNCs in the location, since they want to have a comparable footprint to their competitors in the hotspot (Interview 12, para. 64; Interview 13, para. 8). This drives companies to explore alternative markets such as Vietnam, where emerging cost efficiency meets the growing digital competence.

So, 20 years back everybody was pushing towards India, because India had enormous potential in that regard. Nowadays, India is still quite relevant, when it comes to developing digital solutions, IT operations and all these kinds of things. However, it is meanwhile a little bit more expensive, and it is also there quite challenging, because there is a lot of competition. So, the industry, and we are included, is always looking at other locations that are more emerging. So, for instance, Vietnam is one of those countries which is kind of interesting (Interview 7, para. 11).

Despite the advantages of technology hubs in India or Eastern Europe that offer a balance between talent availability and cost efficiency, the traditionally known technology hotspots, including Silicon Valley, Shanghai, or Berlin remain as the main source of advanced technologies such as AI and data science due to their unmatched skillsets and startup ecosystems (Interview 7, para. 11; Interview 9, para. 22).

But this is always a kind of trade-off. The salaries there are quite low. You have a lot of very enthusiastic people, and they want to, and they get the opportunity. They are really highly motivated, but you can't expect to have the same broad skillsets when it comes to data science solutions or these kinds of things compared to, I don't know, Silicon Valley for instance, where you have a completely different surrounding (Interview 7, para. 11).

Cultural and proximity considerations also play a role in choosing between technology hotspots. In this regard, cultural aspects, time zones, and linguistic capabilities are considered as important factors. To illustrate, Portugal and Spain's proximity to Western Europe makes them an ideal nearshore destination for the interviewed companies, while their (fluent) English capabilities are also advantageous (Interview 1, para. 6; Interview 13, para. 11). India, despite being geographically distant to the interviewed companies, is also favored for the fluent English capabilities; however, its different time zone may make the collaboration between global teams difficult (Interview 9, para. 22; Interview 14, para. 26).

The above-mentioned aspects suggest that the decision to invest in a particular hotspot reflects broader strategic priorities. Whether the goal is to access expertise, reduce costs, or collaborate efficiently, successful localization of IT development depends on aligning these objectives with the attributes of each hotspot. In this regard, the case of Portugal (and partially Spain), is interesting. It seems that Portugal specifically offers a combination of talent pool, cost, culture, and leisure opportunities, which has made the country a unique destination for companies, which also makes it the most surprising technology hotspot indicated by the interviewees.

Furthermore, it seems that the most common methods by which international companies acquire digital expertise in the technology hubs are either through their own subsidiary or joint ventures.

So, from the technology standpoint, we have our own development units in Hamburg, Gdansk, in India, ... so certain kind of 4-5 different locations where our software developers are located (Interview 4, para. 30).

Through inorganic growth through a joint venture. So, this [startup] is a 50% subsidiary of Company 1. The other 50% belongs to [the startup], which is the original company, an IT software service provider that already had the expertise beforehand. They were also relatively big in the area of automotive software and they were simply bought in order to gain this expertise (Interview 1, para. 14).⁶

The approach of partnership involves both acquisitions of startups in order to access advanced technologies and also collaboration with local companies that provide digital talent, as quoted above (Interview 5, para. 13; Interview 6, para. 73; Interview 9, para. 22-24; Interview 11, para. 60). The method then becomes obligatory in countries with stringent regulatory environments or distinct technological demands such as China (Interview 1, para. 18). In this case, establishing a presence can be considered as a strategic move to gain market access and navigate local regulatory requirements.

The last aspect regarding technology hotspots refers to their distribution in companies' global network. It seems that international companies attempt to have at least one technology hub in each region of the world in order to support their digitalization-related activities in the region. For instance, Company 1 considers its technology hub distribution as three world regions and has presence in Silicon Valley in North America, Shanghai in Asia, and multiple locations in Europe (Interview 1, para. 16). Company 6 has also technology hubs in its main markets, where it has production facilities, namely the USA, China, and its HQ in Germany. Similarly, Company 13 has IT-related presence in India to support activities in Aisa, Lisbon for Europe, and interestingly Mexico to support North America (Interview 13, para. 8). The choice of Mexico in this regard is probably due to the company's previous operations and activities in the country and its closeness to North America, which alongside lower labor costs make Mexico a suitable

⁶ Original Quotation in German: Über anorganisches Wachstum durch ein Joint Venture. Also, dieses [Startup] ist eine 50% Tochter von Unternehmen 1. Die anderen 50% gehören [Startup], das ist die Ursprungsfirma, ein IT-Software-Dienstleister, die die Kompetenz bereits im Vorfeld schon hatten. Die waren auch relativ groß im Bereich Automotive-Software und die hat man einfach zugekauft, um diese Kompetenz zu bekommen.

choice for the company. This is in line with Company 7's decision for establishing a technology hub in Brazil.

For instance, South America, Brazil is indeed better for us, simply because they have a very complicated human resource-related governmental frame, so it's really hard to deal with human resource-related topics there. So, it is not that interesting for classical off-shoring companies from the IT perspective, so we as Company 7, since we are already there, have less competitors when it comes to competing around the talents there (Interview 7, para. 9).

Other interviewees also hinted at similar technology hub distribution. However, smaller companies tend to focus on their main markets rather than establishing IT hubs in various locations. As an illustration, Company 8 has its most operations in Europe and therefore, its IT hubs are concentrated in this region, mainly in Spain (Interview 8, para. 10). In general, it can be concluded that large and long-established MNCs with already existing GVC networks, which are typically dispersed around different regions, aim to diversify technology hubs accordingly in order to integrate their global digital business processes more efficiently.

In conclusion, technology hotspots are a crucial element of digitalization in international companies. These strategically significant locations offer a unique set of digital talent, infrastructure, and innovation that supports companies' international activities. While traditional technology hotspots such as Silicon Valley remain pivotal in shaping the global technology landscape, newer ones such as Portugal provide scalability and lower labor costs. This means that leveraging these hubs requires a balanced consideration of various factors based on companies' core business and value chain activities. A right alignment of these factors ensures that digital solutions are developed and implemented efficiently.

As noted earlier in section 3.2.1, there is a lack of research about where exactly technology hotspots are located, which criteria affect international companies' selection of such locations, and which approach is followed to acquire the talents located in these hotspots. The aspects discussed in this section shed light on these research gaps and indicate the role of technology hubs in international companies' digitalization.

The results can be first explained by the RBV and KBV. Digital technologies and their associated know-how are strategic resources in today's business environment (Pereira & Bamel, 2021, p. 558). In addition, the extensive use of digital technologies increases the demand for high-skilled software specialists (Strange & Zucchella, 2017, p. 179). These makes knowledge-

seeking motives as one of the important factors to establish physical presence in technology hubs, as indicated in this section. Such motives, resulting in global search for talents, encourage international companies to offshore innovation and benefit from locations, in which sufficient talents can be found (Lewin et al., 2009, p. 920). This also implies the location advantages provided by technology hotspots.

This offshoring to technology hotspots by foreign companies due to “the war for talent” results in an exceptional increase in domestic employment of digital talents in the hub and hence a fierce competition (Becker et al., 2020, p. 111). This explains why locations like India and Portugal are faced with higher wages after a period of MNCs’ rushing to the regions. After all, the growth of such locations stems from local talent pool alongside MNCs’ activities in the hubs (Manning et al., 2010, p. 379).

The concept of digital human capital also helps explain the results, since it encompasses capabilities of individuals to develop digital technologies and solutions (Grimpe et al., 2023, p. 657). In this regard, digital nomads as talented software developers are especially found in locations such as Spain (Thompson, 2019, p. 28) and Portugal with similar leisure opportunities. This can explain the studied companies’ interest in these two countries as places with high availability of digital talents. Moreover, the availability of critical talent and the identification of global talent pools are among the main objectives of global talent management; MNCs are specifically able to fulfill these goals due to their global presence (Collings et al., 2019, pp. 541–543). This is likely the reason why Company 8, which mostly operates in Europe, has established technology hubs only in this region, whereas other interviewed companies have hubs in several regions around the world.

Furthermore, the ability to decentralize knowledge creation and concentrate specific business areas on specific hubs can be explained by the concept of digital platforms, since such platforms allow the transfer of locally created knowledge to other locations (Grimpe et al., 2023, p. 661), due to digital connectivity and linkage of stakeholders provided by internal digital platforms. Such a fragmented value chain is achievable due to information and communication technologies, facilitating intra-company interactions. This also explains the acquirement of talents through partnerships rather than establishing own subsidiary because digital platforms have the ability to reduce transaction costs and foster interactions with external partners.

Regarding the distribution of technology hotspots in companies’ global networks, many interviewees outlined the establishment of hubs in each region, in which they are operating, in order

to support their regional activities. Thus, it is likely that this distribution reflects MNCs' internationalization strategy in general. This is in line with the research indicating different configurations of talent portfolio based on MNCs' strategy (multidomestic, global, transnational) to achieve competitive advantage (Morris et al., 2016, p. 741).

5.1.1.3 Non-location-bound Working

In the contemporary complex business landscape, the demand for expertise is not restricted to IT specialists or technology hotspots. International companies are in search of specific skills in various business and functional areas, which are typically difficult to find. Such expertise might be found in completely different locations around the world. In this regard, digital technologies allow international companies to connect the needed expertise with the company.

We are looking [for] very specific let's say engineering skills that is hard to find and today we are more flexible to say: OK, if I find somebody who can do that and who is not willing to move to a certain location, where we are present, it is easier to tie that person into let's say a network and still hire that person, for example, to take benefit of specific skills (Interview 5, para. 10).

As an illustration, Company 14 is a small software service provider, which has employed IT specialists from various countries, including Pakistan or South America without having a physical footprint in these countries (Interview 14, para. 16). This has been possible due to global availability of online job matching services on one hand, and digital workplace solutions, which enable remote work on the other hand, making a global employment of high-skilled labor achievable.

I need qualified people. People who are familiar with certain technologies. Of course, these are not available equally in every place, but nowadays they are virtually unlimitedly globally deployable (Interview 3, para. 4).⁷

The advantages of such non-location-bound recruitment have especially become apparent in recent years. The rise of online meetings and virtual tools have rendered physical location increasingly irrelevant. This is contrary to the previous strategies, by which hiring decisions were often limited to geographic borders and local candidates were prioritized in order to facilitate communication, collaboration, and on-site presence. Indeed, there is a trend among companies

⁷ Original Quotation in German: Ich brauche qualifizierte Leute. Leute, die bestimmte Technologien können, mitbringen. Die sind natürlich nicht überall gleich verfügbar, aber die sind zur heutigen Zeit quasi uneingeschränkt global deployable.

to increasingly hire professionals from other countries for various roles, especially for scarce skills (Interview 9, para. 46).

While the geographic location of talents may no longer be a constraint, integrating these professionals into international companies is still a critical aspect, especially in regard to culture and social skills such as their adaptability, communication, and ability to collaborate in multicultural teams (Interview 8, para. 36; Interview 10, para. 24). For example, engineers from Eastern Europe are known for their proactive approach, often exceeding expectations, whereas professionals from India, despite their exceptional technical skills, may require clear instructions to excel (Interview 14, para. 20). Consideration of such aspects is crucial for international companies to have an efficient cooperation between different teams within their global network.

More importantly, the proven effectiveness of remote work has demonstrated that many roles could be performed from home offices, making companies increasingly flexible about where their teams operate, whether in Europe, China, or India.

For us it's not relevant where a person is working (Interview 6, para. 6).

So of course, for us it is not that relevant anymore where our experts within the company sit (Interview 8, para. 8).

I do not care if people in my department are living in Portugal or are living in Spain (Interview 11, para. 62).

This non-location-bound working is even more crucial for MNCs, since it not only allows them to find and integrate specialists located in different countries, but more importantly, it also enables them to distribute tasks across global teams and borders. This has been possible through the connectivity and digital workplace provided by digital technologies. The advantages of such new work, however, is not restricted to IT-related roles.

To illustrate, Company 1 as an automobile manufacturer with various subsidiaries and manufacturing sites around the world, uses augmented reality to allow the engineering team in Germany to co-design the interior of an automobile with its manufacturing team in the USA (Report 27, Company 1, 2021, para. 8). Similarly, Company 11's employees benefit from virtual reality in production for automobiles and also in logistics to plan the shipment of containers across locations in virtual spaces (Report 7, Company 11, 2020, para. 4). Moreover, internal digital platforms of MNCs further facilitate cross-border interactions and enable simultaneous work on projects (Report 62, Company 7, 2023, para. 2–4).

Despite the possibility of non-location-bound working and its advantages, it seems that a couple of factors hinders the full exploitation of remote work from any location around the world. First, the time difference between countries across the globe can complicate the organization of business processes (Interview 9, para. 46; Interview 14, para. 26). For instance, tasks requiring real-time interaction between Asian specialists and North American employees can appear to be difficult due to the time lag. This means that proximity to business subunits and also to local clients plays an important role due to time zones.

So, when we take a look at the, not the core business, but the supporting functions like HR [huma resource], like purchasing, like logistics, like IT is also one, then we have a location, for instance in Poland, we have one location in Malaysia, one in Mexico, where we put together a lot of people, that are remotely working for these functions. So, there are sitting people in Poland managing HR topics in Germany and the whole of Europe. And there are sitting colleagues in Mexico managing HR topics in North and South America. So, from a time zone perspective they should be there, where the target audience sits, but they are not depending anymore on sitting really in the same location, where the people are sitting (Interview 7, para. 3).

Second, legislative and local tax considerations can be a significant restriction to a fully globally dispersed employment. Such a global mobility of employees introduces complexities related to local labor laws and tax jurisdictions. Especially in European countries, working outside of the home country for a specific time can make the employee subject to foreign tax laws. This may force MNCs to have physical presence in specific countries as well as local contracts with employees in order to ensure compliance with local regulations (Interview 12, para. 74). Such a challenge is especially the case for digital nomads with their mobile work and life.

Finally, specifically in respect to IT professionals, a geographically pooled approach may be beneficial. As one of the interviewees indicated, those specialists tend to be more efficient and innovative when working alongside each other.

[...] we said we hire everywhere in the world, also IT folks, wherever the business is. So, following the structure that we had. But what we figured out is that usually IT colleagues are a bit of that specific breed in that sense. You need to put them together so that they are able to really like work together, in inspiring teams and so forth (Interview 13, para. 11).

In conclusion, digital technologies enable companies to eliminate the location-boundedness of the traditional work and connect their global employees, which in turn make global acquirement of talents more flexible. However, it seems that the afore-mentioned restrictive factors lead MNCs to rather follow a regional strategy, have several hubs in different countries, and then employ digital technologies to enhance collaboration between these hubs. This is also in line with the regional IT distribution discussed in the previous section. The remote hiring of specialists in specific countries probably remains for specific roles, allowing companies to also benefit from scarce skills in certain business areas.

The results can be explained by the dynamic capability view as well as the concept of digital platforms. To begin with, digital connectivity fosters dynamic capabilities of MNCs (Nambisan et al., 2019, p. 1476) and enables them to recognize the location, time, and type of necessary capabilities (Luo, 2022b, p. 970). Correspondingly, digitalization allows MNCs to search for specific capabilities globally and integrate those capabilities at any location, enhancing dynamic capabilities in order to address the company's need for specialists at different times. Such non-location-bound recruitments enable international companies to remain agile and respond according to the international business landscape with its rapidly changing demand for various types of skills.

Furthermore, internal digital platforms of MNCs facilitate co-working and co-specializing between employees independent of their location within an MNC's global network due to their ability of value co-creation through direct collaborative interactions of platform participants (Grönroos, 2012, p. 1520). Such an approach eliminates the constraints of communication and the necessity of on-site presence. This provides international companies with the afore-mentioned flexibility to search for global talents and integrate them to the company's network even if the company has no physical presence at the location of the talent.

5.1.1.4 Foreign Footprint

The extent of local presence seems to be different between traditional MNCs and digital companies. Traditional MNCs are usually known for their expansive presence in international markets. This presence can occur through not only foreign sales, but also locating different components of the value chain in host countries, including production. Thus, large manufacturing MNCs have typically substantial footprint in foreign markets. On the other hand, digital companies may benefit from lighter asset footprints due to their core business based on digital services. The main argument for reducing foreign footprint is then the increasingly implementation

of digital platforms, which enable companies to operate beyond geographic boundaries with minimal resource commitments.

According to the interviewees, however, traditional manufacturing MNCs face intrinsic limitations in abandoning their physical footprint. Despite advancements in automation and the increased utilization of digital platforms in MNCs, physical presence in local markets remains essential due to the nature of physical products, which require substantial foreign footprints.

There have been intense discussions over the last five years about whether to take out a few plants and then do a platform business in the market. It's just not that simple and I'm probably saying it myself now: stick to your own rules and this [company] is more of a brick-and-mortar business and less of a scaled non-asset platform business, because we have the wrong people and, to be honest, the wrong collective agreement to guarantee that (Interview 1, para. 57).⁸

Furthermore, a set of other relevant criteria needs to be taken into account, such as local tax regulations, security and geopolitical considerations (Interview 11, para. 4), and also technological and consumer electronics integrated into physical products (Interview 1, para. 53). This suggests that physical products are multifaceted and more complex than digital ones, hindering the reduction of foreign footprints.

On the other hand, digital companies, especially platform businesses such as Uber, illustrate different dynamics. At their core, these companies leverage digital technologies to operate across borders with minimal physical infrastructure. Cloud computing, virtual collaborations, and software-driven solutions enable such companies to enter and operate in markets with ease. However, even digital companies encounter limitations in regard to minimizing foreign footprints. For instance, Company 1's ride hailing service, a digital platform similar to Uber, requires representatives in each city to negotiate logistical concerns like parking regulations and service zones with local authorities (Interview 1, para. 53).

More specifically, Company 9 as an online job matching service is a digital platform, which mostly operates within the boundaries of its foreign markets (Interview 9, para. 2). The reason

⁸ Original Quotation in German: Also die Diskussionen wurden in den letzten fünf Jahren intensiv geführt, obwohl man mal ein paar Werke rausnimmt und aber dann da Plattform Business machen. Ganz so einfach ist es halt nicht und wahrscheinlich sage ich das inzwischen selber: Schuster bleib bei denen Leisten und das [Unternehmen] ist eher Brick-and-Mortar und weniger ist irgendwie ein skaliertes Non Asset Plattform Business, weil da haben wir auch die falschen Leute und ehrlich gesagt auch den falschen Tarifvertrag, um das sozusagen zu gewährleisten.

lies behind the different languages and recruiting processes of local clients, which make the centralization of value chain activities in the home country difficult (Interview 9, para. 4), meaning that such platforms also depend on localized teams to cater to diverse client needs and navigate cultural and regulatory considerations.

[...] coming back to the physical, non-physical aspect, for some parts of the business it needs to be physical otherwise you cannot really run your business, and more on the platform technology product development part, it could be centralized and this is exactly what we are doing (Interview 9, para. 4).

Even in case of software service providers such as Company 14, foreign footprints cannot be totally eliminated because the development and implementation of digital services require infrastructures such as data centers in various locations (Interview 14, para. 72). The reliance on digital-related infrastructures distributed across multiple geographical locations further highlights the persistence of a global footprint for digital companies.

The above-mentioned examples indicate that a lighter asset footprint in foreign markets stemming from digitalization is far away from the reality. International companies still need to invest locally depending on their products and business models. Nevertheless, digitalization can result in reduction of foreign footprints in specific business areas and regarding specific business processes. These mostly include those processes that are not directly related to products and production.

However, why I said I do agree to your assumption is that as soon as we are talking about things that are not directly related to the product and the delivery of the product, we are doing this [reduction of foreign footprints] (Interview 7, para. 3).

This is specifically the case for traditional MNCs with their core business typically centered around physical products. As an illustration, traditional dealerships, once integral to automobile sales in local markets, are transitioning into experimental stores featuring digital customization tools enabled through virtual reality (Report 10, Company 11, 2023, para. 9). Similarly, remote advisory and shared-screen solutions empower sales representatives to interact with customers seamlessly across borders (Report 25, Company 1, 2021, para. 4). These solutions, for sure, reduce the automobile manufacturers' footprint in foreign markets regarding the needed facilities for selling products. The reduction will be further enhanced in future with the help of autonomous driving, which will enable test drives at the customers' private locations (Interview 11, para. 21).

Reducing foreign footprint is also possible in administrative and routine tasks, which can be either automated or done remotely. With the automation of routine tasks, such as in accounting or customer support, it is not necessary anymore to have large centralized workforces because there is less need for employees for those specific tasks (Interview 12, para. 34). Consequently, companies are downsizing office spaces due to not only automation, but also the increased mobile work arrangements, a trend accelerated in recent years (Interview 11, para. 2).

Despite the above-mentioned reduction possibilities in specific areas of a business, foreign footprints remain crucial for MNCs to operate. The impact of digitalization on this matter is limited to specific tasks and usually does not include primary activities of a value chain such as production or logistics. Even digital companies have to rely in many cases on local assets to operate, highlighting the fact that local operation through lighter asset footprint probably remains as exceptions for companies like Netflix.

This result is in contradiction with assumptions in the literature, which suggest that digitalization facilitates a lighter asset footprint in host countries and enables international companies to operate in distant markets with far less physical presence (Banalieva & Dhanaraj, 2019, p. 1376; Casella & Formenti, 2018, p. 101; Hennart, 2019, p. 1393; Verbeke & Hutzschenreuter, 2021, p. 610). This assumption is mainly based on the concept of ecosystems and digital platforms, which foster partnerships with local partners and has the potential to eliminate the need for local presence through physical assets (Drori et al., 2024, pp. 3–4). However, the results support Verbeke and Hutzschenreuter's (2021) suggestion that most companies still need to be present locally. The reason lies behind the necessity of linking digital platforms with local complementary assets such as data centers, representatives, or local customers and business clients. The latter highlights the role of within-country network effects, which imply the location-boundedness of transactions occurred in a digital platform (Stallkamp & Schotter, 2021, p. 65). This is also the case for Company 9, which operates mostly within the boundaries of its foreign markets due to the characteristics of its core business as a job matching service.

Nevertheless, the possibilities of lighter asset footprints regarding specific tasks indicate, as discussed earlier, that an increased flexibility and hence efficiency is achievable through implementing digital platforms in both MNCs and digital INVs. This is in line with the main goal of digitalization in the interviewed companies. Thus, international companies can benefit from the above-mentioned advantages, even though the extent of these advantages is not as expansive as many scholars have suggested in the international business literature.

5.1.2 *Internationalization-specific Decision-making*

The extensive use of digital technologies is believed to change companies' internationalization process. In this regard, internationalization-specific decision-making encompasses those aspects that affect this process. Based on the findings stemming from the text material and illustrated in figure 3, digitalization can influence companies' decisions about their presence in, evaluation of, and adaptation to different foreign markets. Moreover, the process of decision-making in international companies can also be different due to digital technologies. The following sections shed more light on these aspects.

5.1.2.1 Market Presence, Competition, and Barriers

Digitalization has profoundly transformed the strategies and operations of international companies regarding foreign market entry and sustained market presence. This paradigm shift is driven by the convergence of advanced technologies and global connectivity. In this regard, there are differences between traditional MNCs and digital INVs because they typically differ in regard to the level of digitalization.

More specifically, traditional large and long-established MNCs have already excessive presence in many countries, meaning that the use of digital technologies may have less direct influence on their foreign market entry (Interview 12, para. 54). Nevertheless, this role of digitalization is considered as "a more positive effect and less a limiting factor", allowing MNCs to enter certain markets easier and expand their operations in foreign markets as well (Interview 13, para. 8). This suggests that digitalization generally reduces barriers to market entry and fosters international expansion.

Furthermore, digitalization enables a faster internationalization of products. Traditionally, the market launch of physical products in different countries required prolonged timeline due to logistical constraints and localized processes. Digital tools and platforms have enabled simultaneous global launches and streamlined operations, resulting in faster internationalization of products (Interview 11, para. 8). For instance, in the personal computing industry, where laptop or smartphone launches once took months to transition between Asia, Europe, and the USA, digital advancements now allow nearly concurrent introductions across markets. This acceleration is due to the digitalization of logistics and regulatory processes, such as homologation, which can now be managed in parallel rather than sequentially.

This increased speed and the agility needed in the contemporary digital business landscape have put an increased pressure on digital INVs, since such companies typically do not have the extensive presence of traditional MNCs through FDI in foreign markets. As a result, these companies tend to engage in partnerships and acquisitions for their market entry strategies.

We found out relatively quickly, nobody globally is waiting for Company 9's technology to bring our platform to other countries and to build from scratch a new business. It depends a little bit on the country, but this is actually the main paradigm why we recognized relatively quickly [that] in the larger developed economies, globally it's better to think about acquisitions (Interview 9, para. 2).

This means that in markets with strong local competitors, acquisition offers an efficient way to accelerate entry and reduce risks. Moreover, a greenfield investment through FDI requires substantial resources and also time. Therefore, acquiring an established local company can represent a faster approach to enter certain markets. This is especially important for digital companies because digital products have higher risks of imitation and hence, a faster internationalization may help such companies to scale more quickly and prevent competitors from gaining market share. In this regard, partnerships with local companies can also be an efficient market entry strategy, especially for smaller INVs with less capital resources and less knowledge about local markets.

[...] if you look at the big companies that you see also here in the streets like VOI [Swedish mobility company renting e-scooters and e-bikes], the big American companies ..., they try to get feet here in Germany. But it's super important... super difficult, because they don't know the local market and we always work with..., our clients are usually people who know the local market really well, so we work in Italy with the biggest provider there, same as in Spain in moment [for example] (Interview 14, para. 56).

Partnerships with local companies as a market entry mode is especially crucial in case of China not only due to their familiarity with the local market, but more importantly due to specific business environments and regulations of the market (Report 56, Company 2, 2020, para. 9).

Especially China is a very, very, very special case to enter this market. I would say sometimes you have to partner and it is also the best way to partner to enter [the] market (Interview 10, para. 44).

Indeed, many of the interviewees indicated that market presence in China is very important for their corresponding company. The key markets of the interviewed companies, shown in table 5, further highlight this importance. Consequently, MNCs are investing more and more in the market (Interview 4, para. 8; Interview 7, para. 38; Report 40, Company 5, 2019, para. 79; Report 59, Company 6, 2021, para. 5).

For us, China will be a huge market in the future, even bigger than it is today, and of huge importance. That is why we are investing heavily in a combined site in Zhanjiang (Interview 3, para. 2).⁹

This presence is also crucial from the digitalization perspective. As discussed in the section of talents and technology hotspots, China has a great digital talent pool, which makes it attractive for MNCs. This has even led to the strategy of “from China to the World” for some Western MNCs operating in the market (Interview 1, para. 8; Interview 11, para. 54). Moreover, the specific regulatory environment of China alongside its market size leads international companies to be present in the market. As an example, entering the market of self-driving automobiles in China requires the establishment of a joint venture with local companies, forcing MNCs to be locally present (Interview 1, para. 18).

Internationalization-related decisions of international companies are also significantly impacted by global and local competition in the digital era. More and more newcomers from different countries are emerging to compete with established MNCs due to digitalization which offers smaller companies the ability to create innovative solutions and increase the competition. In this regard, China again is an interesting market. The unique characteristics of the market alongside the talent availability in the country has resulted in intense competition with various local rivals competing with Western companies. More specifically, Chinese companies intensively integrate digital solutions to their products, which puts pressure on other companies to offer the same level of digitalization (Interview 11, para. 54).

The automotive industry provides a compelling lens to examine this phenomenon. Companies such as Tesla demonstrate the power of digital integration by leveraging software-based services and simple configurations for automobiles to fulfill evolving customer demands. In contrast, legacy automobile manufacturers usually suffer from offering expansive and complex

⁹ Original Quotation in German: Für uns wird China ein riesengroßer Markt in Zukunft, noch größer als er heute ist, werden, eine riesengroße Bedeutung. Deswegen sind wir da auch dabei, in Zhanjiang in einen Verbundstandort sehr intensiv zu investieren.

configuration options in their products, which contradict with customer preferences wanting a high level of digital integration (Interview 11, para. 31). Moreover, in markets like China, local manufacturers like Nio and XPeng, which are typically “techier” compared to Western manufacturers, are not only reaching but often surpassing their global counterparts in integrating advanced digital technologies (Interview 1, para. 1), such as navigation systems that link seamlessly with local services like restaurants and gas stations. This shifts the traditional competition landscape, focusing more on advancements in digital technologies. As one of the interviewees highlighted this shift:

That people have understood that perhaps the competition is no longer based in [the city of the company's German rival], but rather in Shanghai and somehow on the west coast of Uber and DiDi and whatever they are called (Interview 1, para. 1).¹⁰

The global and local competition seems to play a different role in digital platforms. To illustrate, platforms like Zhaopin dominate the recruitment sector in China while Nauki is the market leader in India (Interview 9, para. 52); These platforms challenge global companies in the industry such as LinkedIn and Indeed, which, despite their global reach, have to localize their offerings (Interview 9, para. 26) to penetrate these markets effectively. Since network effects are an important part of such platforms and building them in international markets is difficult, digital platforms tend to acquire local competitors with sufficient presence in order to enter the market.

When we talk about the main core, what Company 9 is doing. It's actually providing an online recruitment service via a business-to-customer platform. And if I see this that way, it's not an advantage. It's exactly the other way around. The need to look oh, there is an interesting market, Poland, Company 9 is not present. The only interesting company to acquire there is Pracui. It's the market leader. And therefore, mergers and acquisitions are so important for us (Interview 9, para. 52).

The above-mentioned arguments suggest that digitalization has changed market entry modes and market presence strategies of both MNCs and INVs. In this regard, it seems that Chinese companies and their advancement in digital technologies play an important role, pressuring Western companies to adapt their internationalization strategies and invest more and more in

¹⁰ Original Quotation in German: Dass man verstanden hat, dass vielleicht der Wettbewerb nicht mehr in [der Stadt des deutschen Konkurrenten], sondern eher in Shanghai und irgendwie an der Westcoast von Uber und DiDi und wie sie alle heißen.

digital solutions. Such an adaptation requires partnerships with technological companies to gain competitive advantage, especially in China as an essential approach due to the market's specific rule set (Interview 1, para. 42).

Another aspect of foreign market entry and market presence in the digital era refers to digital infrastructures. Digital internationalization requires online expansion in host countries. Such an expansion is associated with the availability of the internet and digital infrastructure in foreign markets. However, the digital disparities between countries, manifested in varying levels of internet penetration and technological infrastructure, prevent the full exploitation of market opportunities. For instance, operating in African markets might be completely different due to lack of sufficient infrastructures compared to East Asian markets where customers prefer digital solutions and the infrastructure can support such a demand (Interview 10, para. 16). Digital infrastructure is especially crucial for digital companies, since their products are dependent on such technological availability. The lack of sufficient internet penetration, for example, hindered a successful market presence in Italy at the beginning of the internet era for Company 9 as a digital company (Interview 9, para. 2). The different levels of digitalization in foreign markets can also affect MNCs' attempt to increase their digital footprints. For instance, digital sales in foreign markets are significantly depended on digital infrastructures.

If you see the level of digital sales of the different countries, it's different also in the countries. Perhaps it's coming more closer, but you see different levels. So, it has also to do with what is the basic IT infrastructure in the countries. Is [the] internet everywhere available? How much is the usage? So, how much is a country developed in IT in general I would say (Interview 11, para. 58).

More importantly, many international companies increasingly rely on advanced infrastructure provided by well-known companies such as Google, Amazon, Microsoft, or Nvidia. For example, as was noted by the interviewees, many MNCs and also INVs are turning to public cloud providers in order to benefit from their infrastructure. These technological partners are mostly US-based. The absence of competitive alternatives in regions like Europe means that this dependency can lead to disruptions in international companies' operations if the political circumstances in the USA change, creating vulnerabilities beyond technology and highlighting the role of geopolitical considerations (Interview 14, para. 68).

Indeed, geopolitical considerations and digitalization-related regulations were considered by many of the interviewees among the most important barriers against digital expansion in various

markets. While technological barriers, such as digital infrastructure, have been significantly diminished over the years, at least in important markets, regulatory requirements have become the most important limiting factor in this regard (Interview 7, para. 47; Interview 8, para. 22). As an illustration, Company 14 lost the opportunity of entering some North African markets due to a change in regulations requiring localization of data servers, which was not possible for the company due to its reliance on public cloud (Interview 14, para. 62). In the same manner, the GDPR in Europe imposes strict data privacy laws, requiring companies to adapt their operations accordingly. Such laws often come into conflict with the operational needs of international companies.

The only thing that is right now limiting us is legislation, it's rules-set coming up from the countries. The geo-risk coming with the interest of individual countries, where they have for them on their own valid arguments why they do this or that, yes, for the European Union with the data privacy laws, there are reasons behind it and I personally think they are good reasons, but in [the] Americas, there are different rules-sets on this. India is quite complicated when it comes to data privacy and these kinds of aspects. Greater China very special (Interview 7, para. 47).

Furthermore, culture can also be a barrier against digital expansion in different markets. For instance, in China, there is high receptivity to digital solutions and less concern over data privacy; in contrast, European employees often prioritize privacy considerations, slowing the adoption of new technologies in companies (Interview 7, para. 31).

Yeah, data protection for sure the one thing, let's call it digital dexterity. So that people are being overwhelmed by every new single step and solution which is coming there. So that is for sure one of the biggest challenges because there are so many ideas and there is a new app and there is a new thing and, in the end, it's all the people that we have over there [foreign markets] and the number of digital changes that you can apply to somebody in a certain amount of time is limited. So, we see that becoming a real challenge (Interview 13, para. 63).

Therefore, the employees' readiness for digitalization plays a crucial role. Especially in MNCs with large employee bases dispersed across various regions, varying levels of digital literacy hinder the effective implementation of global digital solutions (Interview 7, para. 23), while resistance to digital change is not limited to employees but foreign customers as well (Interview 5, para. 33), which further impacts digital expansion of MNCs in certain markets.

In conclusion, foreign market entry and market presence are impacted by using digital technologies. While MNCs may accelerate their current operations, digital INVs may follow a different market entry strategy to expand their international presence. China exemplifies the dual role of opportunities and complexities in this context, emphasizing its market size alongside the need for localized digital services for the market. The country and its competitive companies have also reshaped internationalization strategies of Western MNCs significantly. Moreover, regulatory frameworks in different regions require a balance between global digital ambitions and local realities.

The results can first be explained by TCT, by which reduced transaction costs of managing tangible assets are a reason for faster internationalization (Parente et al., 2018, p. 53). Since digital technologies enable the global connection of assets across borders and within GVCs, MNCs are able to streamline their processes and internationalize their products and services faster, a case seen by the example of launching laptops and smartphones simultaneously in international markets. Moreover, the preference of digital INVs for partnerships and acquisitions is also fostered by favored market-based mechanisms in the digital era, since the digital connectivity results in reduced transaction costs of acquiring information about foreign markets and partners (Drori et al., 2024, pp. 3–4).

Furthermore, the results outline highly increased competition stemming from emerging economies. This competition has even impacted Western companies' digitalization strategies, forcing them to concentrate more on the integration of digital solutions in their products. The reason lies in the fact that the development of digital solutions is faced with less barriers compared to non-digital ones (Saarikko et al., 2020, p. 827), enabling local competitors to emerge (Katsikeas et al., 2020, p. 409), which increases the number of rivals and hence the competition. This requires traditional MNCs' response in order to remain competitive, which is in line with the dynamic capability view and the need for agility in the contemporary business landscape. However, these newcomers are typically faced with liability of foreignness and outsidership while expanding their international presence (Meyer et al., 2023, p. 585). In this regard, MNCs are better positioned due to their long-established FDIs in different markets, which enables them to deal with such liabilities (Parente et al., 2018, p. 58). This explains the tendency of the interviewed digital INVs to choose acquisitions and partnerships as their market entry modes.

The digital infrastructure dependency discussed in this section has not paid attention sufficiently in the international business literature. Such dependencies can prevent international companies from expanding their presence in certain markets, as was the case for Company 14

in several occasions due to its dependency on US-based infrastructures. Specifically, the current geopolitical environments exemplify the importance of such a reliance on specific technologies. Similarly, regulations and national contexts play an important role in the internationalization of companies in the digital era. Digital regulatory risks caused by digitalization-related rules around the world (Luo, 2022a, p. 346) hinder companies' attempt to globalize their digital processes. The local responsiveness needed for complying to local regulations forces international companies to diversify their digital solutions for different regions or markets. This means that the lack of standardization decreases efficiency as the main goal of digitalization and it consequently diminishes digital internationalization of companies.

Finally, the reasons for the importance of China are multifaceted. First, its market size is digitally related and crucial not only for traditional MNCs, but also for digital INVs. More specifically, the concept of digital platforms explains the advantage of such high-clout markets with larger customer bases for international scalability due to the need for positive network effects (Chen et al., 2019, p. 186; Meyer et al., 2023, p. 586). Second, the existence of digital human capital and expertise encourages international companies to expand their operations in the country. Third, its receptivity for digital solutions and its sufficient digital infrastructures can facilitate the integration of activities to MNCs' GVC. And at the end, the specific regulatory framework of the country makes it unique in terms of local responsiveness of digital solutions, which alongside its market size have made the market a very specific case for almost all of the interviewed companies.

5.1.2.2 Market Evaluation, Adaptation, and Personalized Solutions

Digital technologies have introduced new ways of evaluating international markets. While traditional market evaluation tools were often limited to in-person market research in foreign markets, these technologies provide more insights into local customers' behavior and preferences without the need for in-person approaches, enabling international companies to make more informed decisions. Central to this enhancement are technologies such as customer relationship management systems, big data, and AI.

More specifically, the integration of online customer relationship management systems allows companies to remotely aggregate vast amounts of customer interactions across countries, enabling the identification of local trends and preferences. These systems facilitate a direct relationship with local customers, bypassing any intermediaries such as exporters, local marketing agents, or local retailers, which traditionally had the data and knowledge about local markets (Interview 12, para. 8). This transformation allows MNCs to directly gather end-customer data

that was difficult to access in the past and enables a global data pool. The pooled data is crucial for big data analytics providing statistical strengths, which enables MNCs to learn from the data and identify complex patterns in each market. Machine learning and AI are critical technologies to achieve such foreign market evaluations, allowing companies to analyze large sets of data and forecast market trends.

[...] and obviously as well you try with some kind of whatever artificial intelligence to understand a bit what are the trends coming. You know, how they vary in the different countries (Interview 12, para. 32).

[...] we have so many clients with different vehicles in different countries, we have a lot of data ourselves, where we can learn from and that we can use to advise our clients (Interview 14, para. 52).

However, these technologies have limitations as well. Global disruptions such as geopolitical crises challenge the predictive accuracy of these advanced models, since they typically rely on historical data, meaning that forecasting unusual situations is very difficult due to lack of data (Interview 8, para. 45). Moreover, data protection laws in different regions can restrict the effectiveness of such digital solutions. For instance, the GDPR in Europe significantly restricts companies to store and process personal information of their customers, which can potentially limit the ability of finding customers' interests in the region. Consequently, companies have to ensure an anonymized use of data and AI-based solutions in order to comply with such laws (Interview 1, para. 10; Interview 9, para. 40). In the same manner, the transfer of data from China to Europe is not allowed (Interview 1, para. 20), which can prevent the establishment of a global data pool critical for big data analytics, as mentioned above. Such restrictions necessitate region-specific solutions such as multiple datasets to comply with local regulations.

More importantly, the geopolitical and regulatory frameworks prohibit MNCs from applying "one-size-fits-all" concepts, by which a globalized digital solution is created in one location and is implemented in all markets (Interview 1, para. 8). Specifically, the geopolitical situation between the USA and China, as the two lead developers of digital technologies, has significantly impacted the global integration of digital technologies. As an illustration, certain software source codes for autonomous driving developed in the USA are no longer allowed to be implemented in China for security reasons, and vice versa. This means that digital solutions need to be adapted locally, which decreases efficiency through the lack of uniformity.

So, this [technology war between the USA and China] is something that we have to consider and where we have to come up with plans on how to make it possible to do that business, be compliant in that area [China], but at the same time we have customers in the US, that would not be happy, if we then switch completely to Chinese technology for whatever we do. So, we have to differentiate and in different locations sometimes come up with different technological answers to one and the same problem. From an IT perspective, from a global CIO [chief information officer] perspective, not nice because one-size-fits-all is typically the more efficient way (Interview 7, para. 15).

As a consequence, technical development of products has also been affected, requiring more and more localized approaches (Interview 11, para. 8). Moreover, the shift in customer expectations demanding more integrated digital solutions in products, especially in China, has intensified this effect (Interview 2, para. 18; Interview 13, para. 17). The reason lies in the fact that such an integration is closer to end-users in different markets and hence, more localization is needed (Interview 3, para. 24). In this regard, the rise of software-as-a-service models has allowed companies to cater to this change in customer expectations more dynamically (Interview 13, para. 17). Nevertheless, different software is again needed in China compared to the USA or Europe as mentioned before (Report 56, Company 2, 2020, para. 9), making local adaptation of digital solutions crucial.

To illustrate, digital payment preferences such as WeChat Pay must be integrated into digital solutions aimed at local customers in China to ensure market success (Interview 6, para. 54). Similarly, different media channels are needed in the country in order to be in contact with local customers (Interview 12, para. 2). These examples indicate that the impact of geopolitical situations and regulatory frameworks are beyond traditional activities of MNCs, affecting software development as well. This highlights the importance of market adaptation in the digital era.

To adapt digital solutions locally while maintaining efficiency by reducing costs, international companies follow the approach of developing global solutions and then adapting them to each market. More specifically, they may maintain a uniform backend for their software while implementing region-specific or country-specific frontends to meet local needs (Interview 3, para. 24; Interview 9, para. 38). This is especially the trend in insurance industry, where the products are highly software-based and digitalized, but each country has its own regulations for the industry (Interview 10, para. 4). Nevertheless, this global-to-local approach is not applicable in every case, especially due to regulations.

We have global-to-local services. But there are certain things which are clearly developed locally where it's a local-to-local service, so you won't be able to use AWS [Amazon Web Services] as a cloud solution in China. So, that is absolutely clear even if you love to do that because AWS is our global partner with which we are doing it. [In] China, it is Alibaba. (Interview 13, para. 52).

In the same manner, data privacy laws represent a significant challenge in adapting to foreign markets, which require expansive attention, local investments, and costs to comply (Interview 8, para. 49). These law frameworks vary widely in each country, making operating in foreign markets very different in this regard (Interview 10, para. 14; Interview 14, para. 48).

Furthermore, cultural attitudes towards technology adoption also influence foreign market adaptation of digital solutions. Regions like Latin America and the Middle East seem to exhibit high adaptability to digital tools, making them ideal testing grounds for innovative products (Interview 4, para. 26). In contrast, Europe with its more conservative approach to technology adoption requires additional engagement (Interview 11, para. 58). These cultural differences are also crucial in the development of digital solutions. For instance, AI-based functionalities, such as adaptive driving algorithms, must account for cultural differences in driving behaviors, such as differences between German, Italian, or Japanese drivers at road crossings (Interview 1, para. 38).

A further step in local adaptation is offering personalized solutions to local customers. This is possible due to the amount of data that is gathered from products and customers' interactions. As an illustration, an automobile manufacturer can collect a vast amount of data from its automobiles and its customers' behavior during the driving (Interview 11, para. 50), which is bound to local environments alongside local culture in terms of driving. The analysis of these data with advanced digital technologies enables the company to offer its local customers tailored solutions such as predictive maintenance based on the automobile's behavior (Interview 1, para. 48), remote diagnostics and customized scheduling of service appointments for individual customers at their location (Report 25, Company 1, 2021, para. 21), or insurance services tailored to individual customers based on their driving behavior and country's regulations, underscoring the potential of digitalization to address customers' needs across diverse geographies. Providing such digital solutions generate additional value that can even go beyond customers' expectations (Interview 5, para. 31).

Also in marketing, data-driven insights play a pivotal role in personalization. For instance, AI-based tools are able to analyze complex sets of local criteria for an adaptive pricing, such as weather, peak usage periods, and fleet positioning to offer unique prices for each of the customers in a sharing mobility business (Interview 14, para. 50).

The above-mentioned examples highlight the importance of software in comparison to the traditional hardware personalization. Whereas catering to each customer's preferences through hardware adaptation requires various work steps and is associated with significant amounts of time and costs (Report 10, Company 11, 2021, para. 22), digitally personalized products diminish the complexity of various configurations. This is especially evident by comparing modern automobile manufacturers like Tesla, which attempt to differentiate themselves by offering unique digital solutions, with their German rivals as traditional manufacturers.

If you look [at] Tesla, they don't have all these configurations, which make our lives so complicated because if you see [our automobiles] on the street, it's never the same like you saw five minutes before because every [model] is so specific. We enabled this complexity, which was perhaps good in the past and now we see complexity cannot be handled anymore. And it's not even the customer wish. The customer wishes to have a digital car and not the last functionality (Interview 11, para. 31).

While such a hardware personalization requires local investments as well to deliver physical products to the local customer, digital personalization enables MNCs to fulfill their customers' needs remotely. This allows for a balanced approach towards global integration of production with an enhanced local responsiveness.

In conclusion, digital technologies such as AI play an important role in evaluating foreign markets and allow for more local adaptation opportunities. By leveraging these technologies, international companies are not only able to recognize new trends in global markets, but they also can address the different needs of foreign customers. In this regard, geopolitical considerations alongside regulatory frameworks necessitate a further local adaptation of digital solutions.

The results indicate that the use of digital technologies has facilitated foreign market evaluation, since companies have access to much more data. This data is derived from more direct interactions with customers in the digital era, providing international companies with deeper insights about how their customers use their products, which enables them to evaluate foreign markets and local preferences more easily. This makes foreign customers "a valuable source of knowledge for analyzing markets, competitors, technologies, and demands" (Luo, 2021, p. 4)

and is in line with RBV's reasoning. This also explains why the interviewed companies highlighted the extent of the data that they own and indicated the importance of such data for them.

Furthermore, most of the discussed results in terms of market adaptation are to be explained by the global integration-local responsiveness paradigm. In this regard, similarities of preferences in different markets stemming from digital connectivity (Naz & Ahmad, 2018, pp. 137–138) enable international companies to develop a global backend for their IT-related products and increase efficiency, as described in this section. On the other hand, the shift in customers' expectations, different regulations, and cultural attitudes necessitate local responsiveness of companies even in regard to digital solutions. More importantly, the increasing number of regulations regarding data protection in different regions (Luo, 2022a, p. 346) alongside the geopolitical tensions such as the one between the USA and China (Tung et al., 2023, p. 10) prevent a completely global approach in developing digital products, even though such products can be global in nature and be transferred across borders easily. This suggests that similar to the traditional notion of most MNCs following a regional strategy in reality (Rugman & Verbeke, 2004, p. 16), the development of digital solutions is also likely to follow the same approach rather than a global or a transnational one due to geopolitical and regulatory differences.

Finally, the results regarding personalized solutions, such as remote diagnostics or adaptive pricing, are in line with the literature suggesting that digitalization enables “remote localization” due to the extent of data gathered from local customers through digital platforms (Cha et al., 2023, p. 177). The reason lies in the fact that digital platforms provide a tool to reach global customers more effectively, gain knowledge about their behavior, and offer them personalized solutions without the need for extensive local presence.

5.1.2.3 Decision-making and Transparency

The vast extent of data acquired from the increasingly use of digital technologies also affects the top-management's decision-making. In this regard, traditional decision-making processes, often rooted in the experience of top-managers, are transforming to data-driven approaches (Interview 1, para. 28; Report 4, Company 10, 2021, para. 16). The main drivers of such a transition are the top-managers' access to real-time data from different markets, visualization through performance dashboards, and structured storage systems across the world (Interview 3, para. 58). These put pressure on top-managers to provide explanations about why certain decisions are made, forcing them to justify their decisions based on the data and performance metrics (Interview 4, para. 20). For example, top-managers in a traditional manufacturer need to provide data-based arguments to justify why a specific product should be built in a specific location

(Interview 1, para. 28). This paradigm shift has not only made managers more analytical and less reliant on hierarchical decision-making processes, but also increased the transparency and trust among employees (Interview 10, para. 32; Interview 14, para. 86; Report 1, Company 10, 2021, para. 25).

More importantly, decisions were historically and often made in international companies based on anecdotal evidence or isolated inputs from local managers (Interview 7, para. 43; Interview 8, para. 32). Today, however, managers can view comprehensive dashboards that highlight performance metrics, workflow progress, and team activities irrespective of their location (Interview 14, para. 38). This further enhances the global transparency of decisions between business units (Interview 1, para. 24; Interview 8, para. 32; Interview 10, para. 32).

[...] decision-making got more... much more transparent due to digitalization, yes. [...] if we take a look how decisions were made, then they were made quite more locally or isolated in the respect of organizational unit and another organizational unit that might even be affected by this decision didn't even know about it (Interview 7, para. 43).

Except for transparency, the enhanced collaboration and communication between subunits and HQ also enable international companies to support their local subsidiaries because HQ have more data and insights about local activities in each country (Interview 8, para. 32; Interview 10, para. 32). This data allows HQ to streamline international activities between subunits around the world.

So, we have different dashboards that we share between the people we work with. They have first of all a dashboard, where they can see everything that happens on our platform, KPI [key performance indicators] goals, errors, whatever. And also, there is a dashboard where everybody sees who's working on what and who did the last commit and those are... So even if I'm sitting here I see what somebody in India is doing, he doesn't even need to tell me and I can see when he's stuck, when things take too long, and also the team members can see that (Interview 14, para. 38).

Furthermore, functional areas in large MNCs have traditionally representatives in each country to streamline the decision-making in the respective department; the advent of digital technologies and internal platforms, however, diminishes this need due to the connection and the data-driven decision-making process between different departments (Interview 7, para. 43). Such streamlined global workflows have the potential to eliminate the need for multiple approvals,

often hindered by geographical barriers. In this regard, internal digital platforms integrate stakeholders from different regions seamlessly, enabling real-time decision-making. For instance, an approval process involving managers from the USA, China, and Germany can be conducted with the same efficiency of them being in the same office. As a result, such platforms foster collaborative decision-making by orchestrating the process between stakeholders (Interview 10, para. 36). The reason lies behind providing the same level of awareness for global employees through such platforms (Interview 14, para. 90).

Advanced technologies such as AI also affect decision-making in international companies. By leveraging such technologies, international companies are able to not only analyze the data more efficiently, but also create predictive scenarios for strategic planning in global markets, for instance, to evaluate potential investments or operational changes in foreign markets by simulating outcomes of smaller parts in a large-scale decision (Interview 13, para. 56). Such an approach ensures that even complex decisions are made with a high degree of confidence and reliability.

Finally, the increased transparency resulted from using digital technologies is directed not only towards managers and employees, but also towards customers as well. In this regard, one of the most significant impacts of digitalization is its ability to enhance transparency within global supply chains. Industry 4.0 enables traceability of products and processes within supply chains, where complexity and global interdependencies are prevalent, while digital platforms provide consistent communication between companies and partners within a supply chain (Report 24, Company 1, 2020, para. 2). As an illustration, European automobile manufacturers are now able to make all the data from their supply chain transparent and share it with their customers with the help of such a digital platform called Catena-X, which enables the exchange of data between stakeholders (Interview 1, para. 20; Report 52, Company 2, 2022, para. 15). As a result, automobile manufacturers can now provide their customers with detailed insights into the environmental impact of their products by calculating the CO₂ footprint of their vehicles, accounting for every stage of production (Interview 1, para. 20).

In conclusion, decision-making in international companies is impacted by the extensive use of digital technologies, replacing traditional intuition-based approaches with data-driven and transparent processes. This shift has reshaped managerial roles as decision makers and has fostered a culture of accountability while enhancing collaborative decision-making across global teams. Moreover, insights from local activities enable managers to make more efficient decisions and support local subunits by their operations.

The results highlight the importance of data as a crucial element in decision-making. In the digital era, rich data about international activities of the company is delivered to top-managers, which facilitates central control and coordination (Meyer et al., 2023, p. 593). This enables top-managers to not only improve their decisions based on performance metrics, but also streamline the activities across borders and between subunits, as was echoed by the interviewees. Moreover, information is more accessible and transparent as a consequence of digitalization, increasing the knowledge of employees about their company's activities (Kuusisto, 2017, p. 347). Such an effect is crucial in international companies due to the variety of locations, in which the company is operating. Nevertheless, digital technologies eliminate the distance as a barrier for data availability and provide local employees with transparency as well.

In this respect, the results can be explained by the concept of digital platforms. Such platforms can be implemented within companies to connect stakeholders and their activities, hinting at the ability of digital platforms to orchestrate resources regardless of location (Lessard et al., 2016, p. 214). This allows collaboration between different teams across borders, which facilitates collaborative decision-making as described in this section. In addition, top-managers can be provided with performance metrics and real-time data from different locations while receiving feedback from local employees (Interview 14, para. 44). These platforms also connect all components of supply chains and provide a solution to exchange information between stakeholders from different locations, as was the case in the afore-mentioned example of providing transparency for customers in the automotive industry through traceability in the supply chain.

5.1.3 Foreign Subsidiaries and their Roles

As demonstrated in section 3.2, foreign subsidiaries can play an important role in digital transformation of international companies. The analysis of the text material implies that this role primarily refers to their involvement in developing digital solutions. Moreover, local digital-related resources such as local technological partners and digital assets are often acquired by foreign subsidiaries. These aspects will be thoroughly discussed in the following sections.

5.1.3.1 Involvement

In an increasingly interconnected international business landscape, relying on foreign subsidiaries' expertise can provide MNCs with innovative ideas and solutions. In this regard, digital connectivity allows international companies to integrate those local ideas and transform the traditional top-down approach, where HQ-centric solutions dominate, to a more decentralized development of digital solutions. This is especially important, since some countries and their

respective foreign subsidiaries are specialized in specific digital technologies, as described in section 5.1.2.

So, I'm very happy to say, fine Spain, if you have a great idea..., they are very keen at the moment to understand the metaverse, right? So, how can that be exploited by a retailer? So, I don't have to do this centrally, I don't have to do this in all kinds at the same time. So, I let Spain as a lead country dive into this. We look at this. When we understand it's sufficiently well and if it's mature, then we think how we can leverage this in the group. So, there are some lead countries with topics. Sometimes because of local interest by chance, someone wants to go for it. Sometimes because the economy or maybe the environment is just having the better starting position (Interview 8, para. 34).

Such pilot projects have the potential to eventually alter an MNC's global processes. For instance, the foreign subsidiary of Company 1 in Mexico initiated a quality control system using AI-based solutions for final assembly of its products. After achieving local success, the system was rolled out in all other manufacturing plants around the world and significantly improved the efficiency and quality of the products (Interview 1, para. 24). Similarly, Company 3 initiated an open innovation platform in Brazil and rolled it out across its global locations (Report 12, Company 3, 2022, para. 6). In this regard, the crucial point is then to integrate the local digital solutions and capabilities into the company's global network, which requires an orchestration of business processes across borders (Interview 10, para. 34–36).

Such initiatives in smaller and less important markets (or manufacturing sites) have also the advantage of a controlled environment, where the risks of starting new digital solutions are at lower levels compared to main markets (Interview 8, para. 34). On the other hand, foreign subsidiaries in larger and more important markets seem to play a different role. To illustrate, countries such as China and Brazil have encouraged MNCs to expand their local operations and even establish R&D centers locally and create new products and services (Interview 7, para. 33).

In this regard, once again, China introduces itself as a specific case. Foreign subsidiaries of MNCs in the country are playing a more pronounced role in developing digital solutions. They are not only creating new digital services tailored to the local market, but also rolling them out to other markets, changing the traditional strategy of central development of products and business processes in the home market and adapting them locally afterwards (Interview 1, para. 8; Interview 7, para. 33; Interview 11, para. 54).

What also a cultural change is, is that suddenly it [digital solutions] no longer comes from [the home city of the company], but China is rolling out certain functions to Africa, North America, and Europe (Interview 1, para. 8).¹¹

This cultural transformation suggests that subsidiaries, at least in China, may no longer be passive recipients of HQ' strategies, but active contributors to the development of global business processes. Such a change is first due to the market size of China as a key target for most of the interviewed companies (see table 5), suggesting that when the market becomes larger and more important, it provides an opportunity for foreign subsidiaries to be more intensely involved in the process of developing digital solutions. Further, the existence of competencies in the country enables and encourages MNCs to put their focus more on creating new services in China. And finally, such a decentralized development is enabled by digital connectivity, which allows for seamless transfer of the processes across borders.

Another way, by which foreign subsidiaries are involved in digital transformation, is acquisition of or partnership with local technology companies and startups. As discussed in section 5.1.2, many new locations are emerging as technology hotspots, in which digital startups dominate the innovation. In addition, there are often local events for such startups to introduce themselves, and many MNCs take the opportunity to invest in such companies. In this regard, local subsidiaries, as the entity with familiarity with the market and also direct access to the market, have a better position to search for and initiate the engagement with such local partners; nevertheless, the final decision to go through this process and integrate the startup and its digital solutions into the MNC's global network remains in the territory of HQ, similar to pilot projects mentioned above.

There are certain events organized by the local chamber of commerce and industry, where scouting and start-up presentations take place, etc. And of course, you then have the opportunity to make contacts and then pass them on to the respective business managers. So, the real touch with the market is already there through the local companies, but they have no decision-making authority over who we work with. I can't say: "Oh, I'm working with them now." I can prepare it, I can recommend it, I can make contacts, I can also pilot it locally and develop a concept, but ultimately, as the local managing director,

¹¹ Original Quotation in German: Was schon auch wieder so kultureller Wandel ist, dass es [digitale Funktionen] auf einmal nicht mehr aus [dem Sitz des Unternehmens] kommt, sondern China rollt irgendwelche Funktionen nach Afrika, Nordamerika und Europa aus.

I have no responsibility for making that decision. The business functions [in the HQ] have to do that (Interview 3, para. 44).¹²

This was echoed by the interviewee 5, emphasizing that every foreign subsidiary can make suggestions in terms of the acquisition of local companies in order to create new digital business opportunities in different markets. This, however, goes through a central process to be finalized:

[...] and then that goes in the company through a centralized process in order to evaluate the central decision-making whether we want to invest (Interview 5, para. 29).

Ultimately, it can be concluded that the closer the digital solution is to local market and its customers, the more involved the respective foreign subsidiary becomes due to the stronger influence they might have (Interview 11, para. 14). This is important because foreign subsidiaries are typically more customer-oriented and have better insights into local markets (Interview 11, para. 67), enabling MNCs to adapt digital solutions to specific cultural and economic contexts. By leveraging their proximity to customers, subsidiaries can influence the development of digital products to better align with local market needs.

Indeed, foreign subsidiaries are responsible for these needs in each country (Interview 6, para. 63), which dictate how digital solutions must be adapted to specific cultural, economic, and technological contexts. A continuous rhythm of improvement, driven by feedback from local subsidiaries ensures that products remain competitive and relevant, fulfilling the expectations of end-customers.

What kinds of digital products do we need? [For] that we have also then every time the feedback from Pakistan, from India, from Japan, from Milano on improving our digital products. What do customers in India need or in Japan? And that we are doing this continuously out in Sales, in Marketing, in IT Development (Interview 4, para. 16).

The role of local feedbacks extends beyond mere digital product development; it is also critical for functional areas and international business activities. As an illustration, the finance may consolidate data centrally every month, and automatically due to automated systems; however,

¹² Original Quotation in German: Es gibt dann bestimmte Veranstaltungen von der lokalen Industrie- und Handelskammer, wo dann auch Scouting und Start-up-Präsentationen stattfinden usw. und sofort und da hat man natürlich dann die Möglichkeit, Kontakte zu knüpfen und die dann an die jeweiligen Geschäftsverantwortlichen zu übergeben. Also so wirklich der Touch am Ende ganz am Markt ist schon durch die lokalen Gesellschaften da, aber da besteht keinerlei Entscheidungsbefugnis, mit wem wir jetzt arbeiten. Also ich kann nicht sagen: „Oh, mit den arbeite ich jetzt“ Ich kann das vorbereiten, ich kann das empfehlen, ich kann Kontakte knüpfen, ich kann auch lokal piloten und ein Konzept machen, aber am Ende habe ich als lokaler Managing Director dort keine Verantwortung dafür, das zu entscheiden. Das müssen die Geschäftsbereiche [in HQ] machen.

the interpretation and validation of this data often require intense interaction between HQ and local subsidiaries due to differences in financial results of each market and in order to ensure that the data is understood properly (Interview 8, para. 30).

Furthermore, the need for local responsiveness based on cultural relevance and national contexts often necessitates the inclusion of local expertise, further highlighting the involvement of foreign subsidiaries in digitalization. For instance, local expertise is required to adapt AI algorithms for autonomous driving in each market due to differences in traffic signs, road users' behavior, etc. Feedback loops from such local expertise also help other markets as well to enhance their algorithms (Interview 1, para. 38).

More importantly, local expertise is crucial for ensuring compliance with regulatory frameworks, which vary widely across markets as described before. Countries like China, with its stringent data protection laws, demand a deep understanding of local regulations. Similarly, regulations related to customer data exchange often necessitate bespoke and local IT infrastructures in specific countries, making the role of the foreign subsidiary pronounced (Interview 11, para. 38). Without the involvement of local specialists to guide these efforts, international companies may struggle to achieve compliance, risking significant legal and financial consequences. As a result, local specialists help international companies to be complaint (Interview 14, para. 58).

Where you obviously have to involve the local organizations, when it comes to legal regulations. China again as an example: Data Protection Law, Personal Information Protection Law, ... Of course, you have to rely heavily on local experts who understand what the requirements are, what I have to do to be compliant (Interview 3, para. 46).¹³

In contrast to the afore-mentioned aspects about the involvement of foreign subsidiaries in the digital era, Company 14 as a small digital company applies central HQ-driven approaches to develop its software as its main product (Interview 14, para. 80). This can be explained by the fact that such companies usually have corporate offices in different countries rather than foreign subsidiaries, meaning that the reason refers to the company' organizational structure. This was also indicated by interviewee 14, as he worked for several other technology-based companies.

¹³ Original Quotation in German: Wo man natürlich auch sehr stark die lokalen Organisationen einbinden muss, wenn es um gesetzliche Regelungen geht. China wieder als Beispiel: Data Protection Law, Personal Information Protection Law, ... Da muss man natürlich sehr stark auf lokale Experten zurückgreifen, die verstehen, was ist denn eigentlich die Anforderung, was ich tun muss, um compliant zu sein.

I have worked in other tech companies, where we had that differently, where countries were way more involved in developing the product, because there were super specific country-related parts in there, where people here in Hamburg have no idea, that's for our product just by how organically it is like this, but I know it also from other tech companies, where it was differently (Interview 14, para. 82).

In conclusion, the emergence of digital capabilities in different regions has led to a decentralized development of digital solutions, by which foreign subsidiaries play a more pronounced role compared to previous approaches. Moreover, they are central players in local adaptation of digital solutions due to their proximity to local markets. As a result, their feedback is a key factor to enhance and improve digitalization of MNCs. However, achieving this requires a balance between local autonomy and central oversight, since companies' digitalization is usually aimed at standardizing and harmonizing global business processes (Interview 5, para. 27), contradicting a completely localized development. Nevertheless, foreign subsidiaries' needs remain critical, since digital solutions need to be adapted locally due to cultural, economic, and legal circumstances.

The results indicate an evolution in the digital era, by which foreign subsidiaries are participating more and more in the development of digital products and services. As discussed in this section, emerging and important markets, such as Brazil and China, play an important role. These markets tend to give access to diverse ideas and resources, providing subsidiaries with better conditions for creating new innovative solutions (Blomkvist et al., 2010, p. 1538). To this end, the size of the network is an important factor (Decreton et al., 2017, p. 871), meaning that foreign subsidiaries in larger markets can have stronger influences on the digitalization of MNCs due to their large customer bases. This suggests that such countries provide location advantages for their respective subsidiaries, and hence enable them to be more involved in digital development. Moreover, innovation is created differently across locations due to differences in the availability of resources and digital knowledge (Alcácer et al., 2016, p. 505). This also explains why more and more innovative solutions are coming from MNCs' foreign subsidiaries in China.

Furthermore, the role of foreign subsidiaries in terms of acquisitions of and partnerships with local companies is explainable with the concept of external embeddedness and the TCT. The results imply that foreign subsidiaries have become active knowledge-seekers of local partners with digital capabilities. For MNCs, which rather want to internalize such knowledge, foreign

subsidiaries are the contact point with local stakeholders. This relationship is subjected to transaction costs stemming from the external acquirement of knowledge. In addition, subsidiaries' knowledge about local markets is a location-bound FSA, which makes their feedback necessary for the development of digital products. This knowledge is also crucial due to the need for adapting to local regulatory requirements.

Finally, the results highlight the importance of local adaptation and the role of foreign subsidiaries in this regard. Such localization contradicts with MNCs' main goal of digitalization, namely efficiency through standardization. Consequently, HQ-subsidiary relationship is affected, since there is a continuous tension between the above-mentioned goal and subsidiary's preferences (Ekman et al., 2020, p. 586). This might be one reason for final decisions being made centrally, since HQ want harmonized business processes across their locations. On the other hand, local adaptation is mandatory in many cases, hindering a true global approach. The global-local paradigm explains this contradiction and indicates the importance of a balance between the necessity of local responsiveness due to cultural or legal circumstances while pursuing global digital solutions at the same time.

5.1.3.2 Local Resources

In the contemporary globalized economy, international companies face multifaceted challenges in developing smart solutions that cater to diverse markets. A critical factor for success is leveraging local digital resources in host countries. This is especially crucial, since digital platforms are being more and more applied as a strategy to connect business processes across markets. These platforms require partnerships with external suppliers, since complementary resources are necessary for the success of such platforms. Moreover, they have the potential to change the role of local partners and how they are integrated into the MNC's global network.

To elaborate, digital platforms, including internal business-to-business ones, usually need localized complementary resources in different markets. For instance, while PayPal dominates as a payment provider in many countries, it holds limited traction in Spain, where alternative payment methods are preferred by local customers, forcing international companies to cooperate with local suppliers (Interview 14, para. 58). Similarly, WeChat Pay is the dominant payment method in China, which makes local adaptation necessary (Interview 6, para. 54). Central to this localization is the role of foreign subsidiaries as the contact point to local suppliers as well as the one who can integrate local resources seamlessly into the MNC's platform.

Ecosystems for customers: In Germany, you either have Apple CarPlay or you can use Spotify. In China, you have to integrate WeChat, Tencent, and Alibaba. And you probably can't do that from [the home city] either, but at the end of the day you also need local expertise and contacts on site (Interview 1, para. 8).¹⁴

In this regard, China is again a special case according to the interviewees. Due to the political circumstances, regulatory requirements, and business environment in the market, many of the Western digital services are not available in the country. Since the country represents a key market for many of Western MNCs, they are encouraged to integrate Chinese digital services in their platforms in order to remain relevant in the market. Indeed, this is one of the main reasons why many MNCs accept the challenge and the needed efforts to adapt their business processes in the market (Interview 2, para. 14; Interview 11, para. 34). The role of foreign subsidiaries in this respect is that they are mostly responsible for this process. This can explain the extent of international companies' digital-related presence in the market. For example, Company 11 has established a branch of its software development division in China in order to specifically integrate Chinese services in its platform (Interview 11, para. 38), highlighting the role of foreign subsidiaries in the market in the digital era.

Furthermore, such an integration of complementary resources requires partnerships with local digital service providers, hinting at a different set of partnering in foreign markets (Interview 2, para. 14; Interview 13, para. 52). This is especially crucial, since such a partnership is not restricted to business-to-customer platforms, but encompasses business-to-business ones as well. This further emphasizes the external embeddedness of foreign subsidiaries to facilitate the relationships with local partners.

Politics and regulations also affect MNCs' need for local partnerships in order to acquire certain resources and digital-related capabilities. This is often seen in regard to advanced digital technologies, which can be associated with political tensions between China and Western countries. As an illustration, Western companies are forced to cooperate with Chinese companies if they want to develop digital solutions in sensitive domains such as self-driving automobiles (Interview 1, para. 42). MNCs have to then rely on their local subunits if they want to gain access to such technologies.

¹⁴ Original Quotation in German: Ökosysteme für Kunden: in Deutschland hast du dann entweder Apple CarPlay drin oder kannst Spotify nutzen. In China musst du halt WeChat, Tencent und Alibaba sozusagen integrieren. Und auch das kannst du wahrscheinlich schlecht aus [der Heimatstadt] herausmachen, sondern da brauchst du am Ende des Tages vor Ort auch die lokale Kompetenz, die Ansprechpartner.

You have to be present as a company, but of course you also need cooperation with local companies. This is particularly the case in China. You can get an example in China: There are two handfuls of licenses for companies that want to use self-driving cars on public roads. To date, all of these licenses have only been given to companies that belong to the Chinese state at least to a certain extent. This means that there, too, we are forced by regulations to set up a company with a partner in the form of a joint venture so that we can even get this technological license to be allowed to test self-driving cars in China (Interview 1, para. 18).¹⁵

Such regulatory restrictions in terms of accessing to digital technologies are not limited to China. In Europe, for example, the GDPR restricts companies' choices about which digital services are compliant and can be integrated into the company's network. As an illustration, while Google's analytics tools are widely considered as indispensable in web commerce, companies in Europe face challenges due to the Google's compliance with the US regulations and its resistance to fulfill all data protection laws in Europe, necessitating local alternatives (Interview 8, para. 49). This means that foreign subsidiaries of international companies, who want to operate in Europe, have also to search for local partners in certain situations in order to ensure compliance with local regulations in the region.

In conclusion, the necessity of local complementary resources is apparent for international companies aiming to develop and deploy global digital platforms. From addressing local preferences to complying with regulatory nuances, the integration of local resources and partners is paramount. In this regard, the role of foreign subsidiaries is pronounced due to their external embeddedness with local suppliers. This relationship ensures that MNCs have access to necessary technologies and can remain competitive in foreign markets.

The results demonstrate the role of foreign subsidiaries in acquiring local complementary resources. This role can be primarily interpreted by the concepts of digital platforms as well as the dual embeddedness. Digital platforms provide a structure to integrate local complementors into the MNCs' global network. However, local complementary resources are often not internationally transferable (Verbeke & Hutzschenreuter, 2021, p. 612), meaning that MNCs need

¹⁵ Original Quotation in German: Du musst präsent sein als Unternehmen, du brauchst aber auch dann natürlich die Kooperationen mit den lokal ansässigen Unternehmen. Also, ist ganz speziell in China der Fall. Ein Beispiel in China kriegst du: dort gibt es 2 Hände voll Lizenzen für Unternehmen, die autonom fahrende Autos auf öffentlichen Straßen einsetzen wollen. All diese Lizenzen haben bis heute nur Unternehmen bekommen, die zumindest zu einem gewissen Grad dem chinesischen Staat gehören. Das heißt dort sind wir auch wieder regulatorisch gezwungen, mit einem Partner zusammen in Form eines Joint Ventures eine Firma zu gründen, damit wir überhaupt diese technologische Lizenz bekommen, in China selbstfahrende Autos testen zu dürfen.

to manage various local complementors for a successful competition in foreign markets, which is different from the traditional management of local suppliers (Meyer et al., 2023, pp. 585–586). In this regard, the external embeddedness of foreign subsidiaries and their access to local markets play a critical factor in managing the above-mentioned complementors. Moreover, national borders, local preferences, and cultural and legal differences make it necessary for MNCs to rely on their subsidiaries for this purpose. Since foreign subsidiaries are typically familiar with local markets, they can reduce transaction costs stemming from the management of local partners and hence, their role is crucial for MNCs.

Furthermore, local complementary resources alongside advanced technologies, such as the afore-mentioned autonomous driving algorithms, represent critical digitalization-related assets, which is in line with the RBV's and KBV's principles. The necessity of gaining such local resources and the reliance of MNCs on foreign subsidiaries in this respect change the traditional passive role of subsidiaries to active coordinators in integrating these resources. This is then in contrast to the internalization theory, which emphasizes on the transfer of assets from HQ to subsidiaries (Zeng et al., 2019, p. 11) and highlights a more decentralized approach and the importance of local resources.

Finally, market knowledge is a location-bound FSA, which is mostly in the hands of foreign subsidiaries. Since this knowledge is crucial and more pronounced in the digital era, in which inter-company cooperations are commonplace, the relationship between subsidiaries and local stakeholders plays an even more important role, while the HQ-subsidiary relationship is also affected due to the more involvement of local subunits.

5.1.4 Governance, Management, and Coordination

One of the areas significantly impacted by the use of digital technologies in international companies is how their cross-border activities are managed and coordinated. Indeed, the management of such activities was the most discussed topic by the interviewees and accordingly the most coded segments in the text material. As illustrated in figure 3, several aspects were emerged from the analysis of the text material, which will be explained in details in the following sections.

5.1.4.1 Coordination of Subunits

In an increasingly interconnected world, efficient coordination of global subunits seems to be easily achievable. However, such coordination requires not only connectivity, but more importantly harmonization of business processes across locations. In this regard, standardization

forms the backbone of effective global operations. Inconsistent practices across different countries and markets, whether in sales and marketing or production and logistics, hinder the ability to manage GVC activities effectively (Interview 3, para. 24). This means that business processes have to be globally uniformed and harmonized for having better coordination through the automation of those processes (Interview 5, para. 2).

So, just that you have [the information], we have 9.5 thousand different applications. We have, when you go into core domains of what we are doing, just go for sales and marketing, I think we have 55 different solutions globally. So, we are far away from a standard. [...] Reality is that of course in the last couple of years, a lot of solutions have been installed and implemented locally. And there was a reason why that was done. Now it's from what I see it's more like the phase of consolidating them and bringing them to the next level of efficiency (Interview 13, para. 26).

Such harmonization can provide various advantages for international activities of MNCs. Particularly in production and production planning, MNCs can benefit from globally harmonized processes. The reason lies in the fact that digitalized and standardized processes can be easily spread over different locations (Interview 5, para. 2). This enables them to develop digital solutions centrally and then roll them out to other locations through digital connectivity and without the need for further in-person involvements. One of the interviewees demonstrated such an efficiency by the following example.

A better option, for example, is that we have a production plant with a so-called plant 0, so that is basically the theoretical plant that exists virtually in [the home city], where we test new software systems, for example. There, we are testing production processes in this plant 0, for example, and of course we are seeing major increases in efficiency, which will then be rolled out across the board in the plants that were built after 1990, not at the push of a button but with a few more button presses, so to speak. So, that means as a blueprint and of course through digitalization, it is easier to then roll it out at all locations (Interview 1, para. 20).¹⁶

¹⁶ Original Quotation in German: Besseres ist z.B., dass wir natürlich eine in der Produktion mit einem sogenannten Werk 0. Also, das ist im Prinzip so, dass Theoriewerk, was in [der Heimatstadt] virtuell existiert, da testen wir z.B. neue Softwaresysteme. Dort testen wir z.B. Produktionsabläufe in diesem Werk 0 und sehen da auch natürlich große Effizienzsteigerungen, was dann flächendeckend in den Werken, die nach 1990 gebaut worden sind, nicht mit Knopfdruck aber mit ein paar mehr Knopfdrücken sozusagen dann ausgerollt wird. Also, das heißt schon als Blueprint und natürlich durch Digitalisierung ist einfacher, dass dann auch an allen Standorten noch rauszubringen.

Such management of manufacturing sites is possible due to virtualization technologies, such as the creation of digital twins, which aim to make planning and simulation of production-related processes across locations and different time zones more efficient by merging the real and virtual worlds (Report 22, Company 1, 2022, para. 1–2). The connectivity between those sites emerged from the internet and digital technologies then facilitates the roll out of digital solutions and central access of MNCs to their sites in different locations (Report 43, Company 5, 2022, para. 9). Moreover, such connected smart solutions decouple controlling from the physical infrastructure in the local manufacturing site (Report 37, Company 5, 2022, para. 5), enabling MNCs to control various functions remotely.

To this end, business processes need to have the same structure and format across subunits in different locations around the world, otherwise the implementation of the above-mentioned solutions is compromised (Interview 5, para. 15). As an illustration, there are seven different solutions for digital signatures in Company 13, varying across subunits; this means that when a document needs to be signed, for example, in Italy as well as by the HQ in Germany, the signed document by the subunit in Italy must be printed, scanned, and uploaded to another software installed in the HQ due to the lack of harmonization between business processes across locations (Interview 13, para. 30). These inconsistencies decrease efficiency provided by digital technologies for coordination of activities between subunits. Conversely, uniform structures and processes enable MNCs to be agile and adapt their activities according to the business landscape.

We stay and then say something and then the whole company is moving in that direction. That makes us really very fast and consistent, and there is no different scheme, and [subunits] have the same standard. The delivery center in Bangalore, for example, they have the same equipment [as] in Germany. There is no differentiation. Everything is worldwide the same (Interview 6, para. 24).

One of the areas which is significantly impacted by such harmonization is global production planning. In this regard, MNCs, particularly manufacturing companies, have to manage a growing number of product derivatives launched at staggered intervals across multiple production sites worldwide. Digital technologies and connectivity help fulfill the increasing need for global coordination necessary for such an intense production system. For instance, the establishment of centralized and regional distribution centers has allowed for streamlined production sequences and has minimized onsite inventory needs, ensuring just-in-time delivery aligned with

real-time demands, as opposed to traditional approaches of allocating warehouses to each manufacturing site in different countries (Interview 7, para. 17). Such solutions are applicable due to connectivity between subunits around the world stemming from the extensive use of digital technologies in production.

So, for example, if there is [the] production of one of our entities in China, and I think it's Chengdu, and there is a partner production which is in Amberg [Germany], as the two of them are on time, in real-time connected with each other, they are able to see where the production is and they are able to see what the failure rate is. They are able to see and adopt and also address issues that are coming out of that (Interview 13, para. 20).

In this respect, digital platforms provide the basis for the needed coordination by pooling data from machines, equipment, and systems into an industrial cloud (Report 6, Company 11, 2021, para. 5). These platforms have become the baseline for every activity in production (Interview 6, para. 14) and enable plants to become part of a connected network, enhancing flexibility in production. Such flexibility even enables, for example, a single plant to produce multiple product models from different brands in one specific location, despite the various suppliers involved in such complicated manufacturing (Interview 11, para. 8).

In conclusion, digital technologies can enhance the coordination between subunits by connecting them across locations. Harmonization of processes is an essential step to achieve seamless coordination, otherwise, digitalized processes may not result in the advantages desired from the implementation of digital solutions. Moreover, digital platforms, advanced analytics, and virtualization have provided MNCs with unprecedented levels of flexibility and efficiency, particularly in production and in terms of coordination between manufacturing sites, supporting agility and response of MNCs to market demands.

The results shed light on the power of digital technologies to enhance coordination between subunits. More specifically, digitalization can create a network of manufacturing sites around the world, which are interconnected through advanced technologies and digital connectivity. In this regard, advanced solutions reduce information costs and the connectivity decreases communication costs, both resulting in reduced coordination costs (Bloom et al., 2014, p. 2867). The reason for such reduction lies in the standardization of processes resulted from digitalization (Chen & Kamal, 2016, p. 566), since the above-mentioned solutions provide a common

language between subunits (Bloom et al., 2014, p. 2867). Consequently, a more agile and seamless global production is fostered by improving coordination through standardization.

The concept of digital platforms can also help explain the results. Internal digital platforms applied within an individual company facilitate the coordination of subunits by networking supply chain activities. Such platforms connect different locations and manufacturing sites, allowing MNCs to become “digitally networked orchestrators” of their subunits (Banalieva & Dhanaraj, 2019, p. 1384). This is crucial for an efficient global production, in which processes are harmonized and coordination costs are reduced.

5.1.4.2 Data and Resource Management

In the digital era, data plays a very crucial role, since it provides companies with the ability to navigate business complexities by offering insights that can enhance coordination. For international companies, which are typically characterized by their operations in multiple regions, the gathered data from international operations represents an opportunity to increase coordination efficiency across borders. This becomes particularly important when considering the scale at which such companies operate. For large MNCs with a global footprint, data can provide an integrated view of operations across different countries and regions (Interview 1, para. 1).

What digitalization helped to do and digital solutions helped to do, is to get one thing right, which is data and the use of data across the value chain, and across the countries, and across the globe (Interview 13, para. 20).

Despite the amount of data obtained through international operations, the gathered data is often unstructured, making it a challenge to process and analyze (Interview 14, para. 54). To structure the data, MNCs establish governance and coordination systems in order to ensure that data is maintained properly. This is important because data, as a digital asset, does not typically remain local, unless it is not relevant for international operations (Interview 7, para. 45). To this end, Company 1 has contact persons in each of its functional areas, who are responsible for the data generated; this process is further enhanced by data stewards who deal with entering local data in the system (Interview 1, para. 20). Similarly, Company 7 uses this approach to ensure the quality of data.

So, this is a distributed job, if you would like, because for one and the same kind of data in the different areas, there are persons responsible for making sure that the data is correct that is being produced there (Interview 7, para. 21).

Furthermore, it is important that functional areas and subunits not only have access to data, but also actively enter new data into the database of the MNC. To this end, incentive systems can be applied to encourage subunits to share their data (Interview 1, para. 24). Indeed, data sharing among various stakeholders in MNCs' global network is facilitated by data management systems and is a crucial factor for companies' success in the digital era.

But these [data management and sharing] have made it possible for us to have transparency, both about what data we have in the areas and, even more importantly for the company's success, that we can now also exchange data across the company (Interview 1, para. 20).¹⁷

Such data management fosters transparency (Interview 1, para. 20), while data sharing enhances collaborations among employees (interview 14, para. 38), functional areas, and subunits. In this regard, sharing data across borders was traditionally a complex and slow process, hindered by physical infrastructure and time zone differences. However, with the advent of cloud computing, MNCs can now store vast amounts of data on centralized data centers, making them accessible from anywhere in the world, at any time.

We have also a data lake structure, Company 7 data platform. So, any relevant information is in this data lake, which at that point in time is available everywhere. And physically, this data lake is with Microsoft Azure in Amsterdam. And we don't even have a subsidiary in the Netherlands, so this data is just stored there, but it is immediately available to the whole world (Interview 7, para. 45).

Such data sharing enables MNCs to manage and monitor supply chain activities in various locations (Interview 13, para. 20). Central to this management are data platforms that are able to connect stakeholders and partners in the supply chain of MNCs. Such platforms need to include not only internal data within an MNC, but also external ones. This is especially crucial in industries, where various companies and suppliers from different countries are involved in the supply chain. For instance, the transportation and logistics industry has established an industry-wide data platform for managing data sharing among companies and suppliers in the industry (Report 33, Company 4, 2019, para. 5). Such data management and governance frameworks

¹⁷ Original Quotation in German: Aber diese [Data Management und Sharing] haben es geschafft, dass wir eine Transparenz haben, sowohl welche Daten wir in den Bereichen haben, als auch noch wichtiger für den Unternehmenserfolg, dass wir auch inzwischen quer über das Unternehmen Daten austauschen können.

allow the participants to retain control over their data being shared through the platform while benefiting from the data being accessible by other suppliers and partners from around the world.

Despite the advantages, data sharing also raises concerns about its risks. The extensive data sharing among manufacturers and suppliers often leads to a close collaboration between them. However, the deeper collaboration and interconnectedness increase the risk of IT security. As an illustration, when a data leak occurs with a supplier, the MNC becomes vulnerable as well due to the shared data and interconnectedness between them (Interview 11, para. 44). On the other hand, local subunits and suppliers can also experience disadvantages. The real-time access to data and hence more comprehensive insights over GVC activities may increase the pressure of HQ on local subunits when their performance does not fulfill expectations (Interview 1, para. 24), or suppliers' actions do not match the MNC's strategies (Report 52, Company 2, 2022, para. 14).

Another important aspect about data and resource management refers to how digital technologies help international companies manage global interdependencies in their GVC. This is crucial because international companies face an increasingly complex business environment characterized by diverse operational challenges, intensive competition, and an increased interconnectedness with their global suppliers and partners as mentioned above, highlighting the need for enhancing communication, coordination, and governance among stakeholders. In this regard, a central IT system, which consolidate data, applications, and operations within a single framework, has emerged as a critical solution for managing this complexity.

So, the one central IT system is used in Pakistan, Chile, Japan, everywhere in the world. Everyone is using the same one core system. Other shipping companies have sometimes 3, 4, or 7 different systems based on the regions, and that sometimes causes the problem that the region Middle East or Asia has no clue about what's happening in North Europe or in North America (Interview 4, para. 16).

At its core, a central IT system integrates an MNC's resources and business processes into a unified technological infrastructure that is accessible from multiple geographic locations. Such systems mostly refer to internal digital platforms and allow for seamless communication between employees, assets, processes, and subunits. Moreover, they provide the HQ with powerful governance choices through the centralization of data management and the standardization of business processes.

So, it's really kind of, all the data, the production data gets in there, gets redistributed. All the R&D information, all the lists of things are in sequence to be produced, all this comes and is being coordinated in this one single system and for sure there are other functional modules attached to this system, but it's still one system. It's one big system environment really coordinating the whole world when it comes to what is being produced, what is being shipped, what is being sold, and everything around it (Interview 7, para. 19).

In addition to production and logistics, international companies benefit from such central IT systems to manage customer-related, supplier-related, and employee-related activities by applying digitalized governance systems (Interview 6, para. 14; Interview 9, para. 36; Interview 14, para. 86; Report 4, Company 10, 2021, para. 11). To this end, companies tend to benefit from the well-known solutions offered by technology service providers, such as SAP ERP system, Salesforce for managing customer-related interactions, or ServiceNow for employees. Such standardized and prepared digital solutions may have the disadvantage of not being tailored to unique needs of each MNC. Nevertheless, larger MNCs can have the opportunity to collaborate with these technology suppliers in order to customize the services based on their preferences (Interview 7, para. 25).

So, what we are trying to do for that whole platform thinking is really using a best-of-suite or a best-of-breed suite which is out there in the market. We usually partner as Company 13 with those large [technology] companies, to really be also part of the development of the solutions because with [+300.000] people, with the brand of Company 13, a lot of [those] companies like to also use us as a reference for their development (Interview 13, para. 26).

Ultimately, the above-mentioned arguments indicate the importance and advantages of centralized integrated IT systems. However, country-specific requirements, including legal obligations, challenge the global integration of business processes. Especially, regulatory frameworks restrict how digital solutions can be used across borders (Interview 11, para. 50), and markets and subsidiaries' preferences also require local adaptation of IT and data management systems, at least to a certain degree (Interview 7, para. 27). For instance, data collected in China cannot be transferred to Europe, since Chinese regulations mandate that local data remain within national borders (Interview 1, para. 20; Interview 13, para. 50). This necessitates the establishment of separate IT systems (Interview 11, para. 38), or at least a copy of the central IT system, for

example the central ERP system, in specific countries or regions, which hinders the orchestration of global data and resources through digital platforms.

And for example, with China, everything must be located on servers in China. So, that means for example it's one system, but we have that in different locations in the world (Interview 4, para. 42).

One area particularly affected by the afore-mentioned connection and centralized systems is product development, in which real-time feedback and global coordination among diverse teams can significantly improve the development process. In this regard, the afore-mentioned digital platforms allow feedbacks to be directly received from suppliers and customers (Interview 2, para. 12). For instance, automobiles need to be gone through intensive testing on roads in different locations. The results of such testing need to be accessible for many departments and teams involved in the development across the globe. A central platform, which connects global teams and assets, enables direct feedback from test engineers alongside real-time data from sensors as the automobile is driving on roads by the test engineers (Report 48, Company 2, 2022, para. 2). This setup allows the development team to address issues without delays and irrespective of locations. As an illustration, an engineer in the home country can actively be informed about anomalies in measurement data collected by testing automobiles in host countries (Report 48, Company 2, 2022, para. 7). More importantly, such direct feedbacks are not limited to product development, since they are also instrumental in procurement by connecting global suppliers to the HQ and the relevant division (Interview 11, para. 10), underscoring how data management systems enhance coordination and agility of international companies.

In conclusion, data has become an invaluable resource in the digital era, shaping how international companies operate, innovate, and compete on a global scale. Consequently, its availability across borders through data management systems and cloud-based solutions plays an important role in enhancing governance and coordination of international business processes. By enabling seamless data sharing among employees in GVCs, digital technologies have enhanced operational efficiency and improved communication. In this regard, central IT systems seem to be the comprehensive solution to orchestrate data and resources across international companies' global network by standardizing operations and connecting corporate resources.

The results highlight the importance of data and digital resources in international companies' operations. This is in line with the RBV principles and indicate digital information as valuable resources for international companies. More specifically, collecting, processing, and sharing

data help MNCs gain more insights about their GVC activities and consequently control stakeholders' behavior (Stonig et al., 2022, p. 1952). This explains why the interviewed companies established data management and governance systems in order to systematically deal with digital resources across markets. In this regard, digital connectivity facilitates MNCs' and subsidiaries' access to such data.

Furthermore, centralization of data and resource management enables MNCs to manage interdependencies in their global network more efficiently. The concept of digital platforms explains such management through connecting global stakeholders. Such platforms can manage not only internal interdependencies within MNCs' value chain, but also external ones, encompassing external stakeholders as well. This is crucial due to the contemporary trend towards partnerships and horizontal integration in GVCs (Hernández & Pedersen, 2017, p. 140), which was also described in this section by indicating how MNCs and suppliers share data and information through platforms in specific industries. Moreover, such platforms reduce coordination costs in both market and hierarchy (Chen & Kamal, 2016, p. 566), and hence facilitate hybrid approaches (Banalieva & Dhanaraj, 2019, p. 1380). This is an important factor to explain how MNCs encourage stakeholders to share their data while preventing the associated risks. To this end, digital networks implement incentives and control to orchestrate international activities (Chen et al., 2022, p. 156). This is in line with the findings suggesting that MNCs incentivize subunits to share their data by giving them broader access to data platforms the more they provide data. On the other hand, they prevent risks by controlling this access.

Finally, the global integration-local responsiveness paradigm can explain the reasons for challenges of achieving a fully global integrated IT system. While global coordination of activities increases efficiency, country-specific and region-specific regulations for data management alongside local preferences force international companies to adapt accordingly and respond to local demands by processing and storing local data locally. Nevertheless, the centralization of data management has still provided MNCs with significant advantages despite of the needed localizations.

5.1.4.3 Power of the Headquarters

As demonstrated in previous sections, digital technologies foster coordination of global interactions, altering how international companies manage complex interconnections across borders. In this regard, the role of HQ is highlighted, since more and more business processes are becoming standardized and more decision are being made centrally in the home market. The reason lies behind the scope of data availability for HQ and the connectivity, which changes how

MNCs manage and distribute resources and digital solutions across borders. Such connectedness can provide MNCs with the ability to be in the hub position in a digital network and centrally control interactions in the network. To this end, technologies such as cloud have especially increased the connectedness and have facilitated the centralization of decision-making.

This [global implementation of solutions] is of course becoming much more of a central, global control issue, especially with the cloud as a technology. And one could then conclude that the functions responsible for this perhaps play a little more important role (Interview 3, para. 14).¹⁸

This is crucial, since digitalization encompasses the integration of digital technologies into all areas of business operations, from production and logistics to marketing and customer service. For instance, a central ERP system enables MNCs to manage all their manufacturing sites and global production from home (Interview 7, para. 3), while marketing tools applied by HQ can bring global data together and centralize marketing campaigns (Interview 8, para. 30). Such tools can then eliminate or reduce the need for local conduction of business processes, since digital solutions are being applied directly from the central hub (Interview 1, para. 36). These digital solutions have the potential to enhance centralization and hence the power of HQ.

However, the findings are multifaceted in this respect. To this end, various factors need to be considered, including industry characteristics, corporate culture, and the nature of global coordination in international companies. To illustrate, Company 8 has transformed from a decentralized retailer to a centralized orchestrator of global sales due to the extensive implementation of e-commerce in its international markets (Interview 8, para. 22). On other hand, Company 9 as an online job matching platform, which should theoretically be able to centralize most of its international activities, has various local processes regarding marketing and sales due to the nature of its industry limited to national boundaries; although its product development, IT, and finance are centrally controlled (Interview 9, para. 28).

Furthermore, corporate culture and organizational structures seem to be important factors in determining the degree of centralization, meaning that digitalization may not significantly affect the power of the HQ, even though it can foster centralization through standardization and connectivity.

¹⁸ Original Quotation in German: Das [globale Implementierung von Lösungen] geht natürlich sehr viel stärker gerade mit dem Thema Cloud als Technologie in die zentrale, globale Steuerung rein. Und könnte man dann damit folgern, haben vielleicht die Funktionen, die dafür verantwortlich sind, etwas mehr Gewicht.

The HQ has a lot of say. The individual business is much more driven by historical and cultural things. But now by saying, ok, this might make sense to do it a little more centrally or so. Reality is, that is driven by history, by culture much more so than by let's say the pure greenfield approach how would I do it if I would draw the company from scratch and start everything again (Interview 5, para. 23).

This seems to be especially evident in smaller MNCs and in specific industries. For instance, Company 6 was compared to France by interviewee 6, in which “everything is steered and controlled from Paris” (Interview 6, para. 24). This suggests that digitalization plays a less important factor in such a structure. Similarly, Interviewee 14 indicated that business processes are concentrated in the HQ of his company but highlighted that other technology companies in which he worked, followed a different approach (Interview 14, para. 80–82), suggesting again that corporate culture may play a more important role than digital technologies.

More importantly, decisions about specific topics such as cyber security are exclusively made by the HQ without the involvement of local subsidiaries (Interview 3, para. 18; Interview 10, para. 32). Nevertheless, there is a certain level of openness for subsidiaries when the necessary criteria such as secure architectures and standardized processes are fulfilled (Interview 3, para. 18). Moreover, the development of digital solutions demands a more flatten organizational hierarchy (Interview 10, para. 32). This is in line with previous arguments that digital technologies foster collaborations between global teams by facilitating connectivity, communication, and direct involvement of stakeholders in GVCs, as described in previous sections. In addition, country-specific regulations also require the involvement of local subsidiaries, preventing the HQ from centralizing all business processes by digitalizing them.

[...] when you think IT, you have two extremes: On the one side, you have the extreme to say, I do everything corporate central. I define those out of 50 applications and this is everything that you can use. Perfect on cost, perfect on cyber security, perfect on multi-markets and non-steering. The challenge is that while something is fitting for Germany, it might not fit for Japan and it doesn't even fit for anything which is in China due to local regulations, due to size, and also due to type of the business. [...] The other extreme is, everybody can do whatever they like. Which is build up whatever you want to do. Then you have the perfect fit for the solution over there, but all the disadvantages that I told you, which is cyber security cost, implementation, and so forth. And really from an organizational point of view, that is an interesting point, also from a governance aspect (Interview 13, para. 28).

As a result, digitalization does not seem to necessarily lead to a complete shift towards centralization or decentralization. Rather, it enables international companies to strategically centralize some functions and business processes while decentralize others.

I think we will see both directions. One much more HQ-driven because everything can be done [centrally]. And on the other hand, also much more decentralization (Interview 11, para. 67).

As an illustration, the automotive industry has heavily relied on local sales representatives to sell automobiles, whose role is becoming less important due to offering more and more digital solutions in automobiles, which are developed and delivered centrally (Interview 1, para. 22). On the other hand, automobile manufacturers are leading towards the decentralized development of such digital solutions in China rather than in their home markets (Interview 1, para. 8; Interview 11, para. 54). In the same manner, central IT systems enable MNCs to have expansive control over their cross-border activities, as described in the previous section (Interview 4, para. 16; Interview 7, para. 19). Simultaneously, such systems also allow for direct feedback from global stakeholders in the value chain, which fosters decentralization (Interview 2, para. 12; Interview 11, para. 10).

In conclusion, digitalization of business processes allows for a high level of standardization while digital connectivity makes the processes easily applicable and transferable across borders. This provides HQ with extensive control over cross-border interactions. On the other hand, the transferability of digitalized processes enables collaborations between HQ and subunits, suggesting that digital technologies may result in an increased central control while foster global interactions as well.

The results point at a hybrid approach, by which both centralization and decentralization are facilitated by the use of digital technologies. This is in line with arguments in the literature highlighting the hybrid nature of digital governance, by which cooperation is fostered through market-based mechanisms while controlling the internal activities is conducted through hierarchies (Banalieva & Dhanaraj, 2019, p. 1380). This is mostly possible due to the extensive use of digital networks by MNCs, which facilitate the orchestration of international activities (Drori et al., 2024, p. 4). Central IT systems, such as ERP systems, are among these networks. Such networks are based on the concept of digital platforms that explains how HQ, as the hub of the networks, are able to govern global interactions by internalizing and centralizing business processes. On the other hand, digital platforms can increase cooperation between participants due

to reduced transaction and coordination costs alongside the connectivity provided by such platforms. These collaborations and partnerships are critical in the digital era to remain competitive. Crucially, digital networks need to rely on local assets and components (Verbeke & Hutzscheutner, 2021, p. 613), making a fully centralized governance unlikely, which was suggested by the interviewees.

Finally, the global integration-local responsiveness paradigm explains why a fully integrated governance through digitalization is not viable. Despite the ability of digital technologies to standardize business processes and make central governance more likely, industry characteristics, regulatory frameworks, and local market preferences still require the local responsiveness of international companies. In this regard, the involvement of foreign subsidiaries seems to be crucial, as discussed in section 5.1.4. Such an involvement ensures that digital solutions are adapted locally, and local suppliers and partners are internalized in the global network of international companies.

5.1.4.4 Technocratic vs. Person-oriented Coordination

As demonstrated in previous sections, digital technologies have emerged as transformative forces, facilitating coordination in international companies and changing decision-making paradigms. Many business processes are now digitalized and hence standardized, which help integrate them vertically in companies' global network. Moreover, digital technologies such as AI can automate many decision-making processes. Such trends hint at the role of technocratic coordination instruments in the digital era. These instruments, as described in section 3.2.4, facilitate the above-mentioned vertical integration through the use of standardized tools and rules such as formal reporting systems, centralization of decisions, or standardization of decisions. In this regard, it seems that digital technologies can foster and increase the use of such coordination systems.

Indeed, technocratic coordination instruments are dominant in regard to routine operational tasks, where many processes are automated and decision-making is relied on algorithms and data (Interview 8, para. 20). The reliance on algorithms diminishes the need for human intervention, leading to more objective, efficient, and coordinated interactions.

I would definitely say yes when it comes to day-to-day operational decisions. The human component has diminished (Interview 1, para. 30).¹⁹

¹⁹ Original Quotation in German: Auf tagesaktuellen operativen Entscheidungen würde ich ganz klar ja sagen. Da ist diese menschliche Komponente weniger geworden.

When it comes to let's say just regular processes, then I would say you don't need that much of a human factor anymore (Interview 5, para. 17).

The use of technocratic coordination instruments is exemplified by the afore-mentioned central IT systems, which enable the central management of global interactions through standardizing processes. As an illustration, digital solutions can be developed in the HQ and be rolled out digitally to global manufacturing sites without the need for experts being present at the locations to install them (Interview 1, para. 36). Such centralization eliminates human interventions, and hence the need for person-oriented coordination. In the same manner, a digital bill of lading enables coordination between various stakeholders by connecting them in the transportation industry through a standardized and harmonized document (Interview 4, para. 34). Such a bill hints at formal reporting systems, which do not need interpersonal communication to address interactivities between stakeholders.

Interestingly, sustainability issues and the need for tracking supply chain activities have further intensified the use of technocratic coordination instruments in the digital era. Since international companies have to report their sustainability efforts, a vast amount of data must be collected from their global supply chain network, including global suppliers and partners. This requires intensive coordination and communication with stakeholders in the supply chain. To this end, digital networks facilitate the data collection and coordination by automating processes and formalizing reporting systems (Interview 13, para. 20). Therefore, person-oriented coordination instruments play a less important role in such reports.

Conversely, the above-mentioned reduction of human intervention in operational tasks enables managers to be less involved in day-to-day decisions and focus more on long-term strategic decisions, by which even more interpersonal coordination is needed and automation cannot address them (Interview 1, para. 30). Person-oriented coordination through meetings and discussions becomes crucial in this context, since it facilitates a deeper understanding of diverse aspects and aligns stakeholders on shared goals.

More importantly, differences in culture and business environments highlight the limitation of centralized decision-making due to less familiarity of HQ with local culture in regard to technological change (Interview 1, para. 30). In such cases, personal interactions become critical for navigating unique interdependencies. Similarly, resistance to such a change and digitalization needs person-oriented coordination rather than standardized processes.

If there is a situation, which we have from time to time, where there is resistance in an organization, if it is difficult, if people need to be convinced to change directions or something like that, then I believe it [person-oriented coordination] is still important (Interview 5, para. 17).

Nevertheless, digital technologies not only increase the use of technocratic instruments, but they also impact the efficiency of person-oriented instruments in various ways. To illustrate, online tools such as Microsoft Teams or Zoom enable real-time communication and collaboration across time zones and geographies (Interview 14, para. 26). These digital solutions enhance cross-border coordination among globally distributed teams and reduce the need for in-person interactions.

In the office it's simple, because we have events. And what we do is, our team leads have in their KPIs [key performance indicator] certain points where they have to do certain events with their team even online. So, they have online learning, knowledge exchange, and they have to also do online events with their team and we have for instance one completely remote team, so that's several people that work in different countries and even the team lead is not in... is also remote (Interview 14, para. 32).

The adoption of online meetings has been especially accelerated in recent years and online collaborations have become more established in companies' working culture (Interview 3, para. 56; Interview 8, para. 18). At the same time, clear protocols and guidelines are required in such an online collaboration in order to ensure purposeful communication between different cultures as well as standardized interactions, whereby working methodologies such as Scrum and digital tools like Slack facilitate the communication and the formalization of interactions (Interview 8, para. 32; Interview 14, para. 26).

The online meetings have also reduced the need for manager transfers and visits as two of the person-oriented coordination instruments. Such advancements in communication allow managers to conduct meetings remotely, which reduce the need for travelling to other locations.

Digitalization now in the office space obviously when I'm talking about [Microsoft] Teams and so on, this means we don't need to travel that much anymore. So, five years ago, every month I was in China. Now, I [have] not [been] in China for three years, but I have at least the same contact like before because the digitalization in the communication has improved a lot in the last years, so it's not necessary... it's still necessary, but not that much to travel to our locations (Interview 11, para. 8).

Furthermore, many problems and issues occurred in foreign subunits can be handled remotely. For instance, companies are deploying augmented and virtual reality in their global manufacturing sites to help local employees receive real-time instructions from experts in the HQ and conduct, for example, maintenance or process optimization remotely (Interview 7, para. 23). Even when visits are necessary in such cases, the above-mentioned technologies can eliminate the need for multiple specialists to travel (Report 52, Company 2, 2022, para. 7). Such solutions are applicable due to the implementation of information and communication technologies in manufacturing sites of MNCs (Report 30, Company 1, 2021, para. 10). Moreover, IoT and AI further diminish the need for visits by providing data about machines and predicting the expected defects in real-time, which allow for remote condition monitoring and hence less need for experts to be on-site (Report 38, Company 5, 2022, para. 9; Report 45, Company 5, 2021, para. 1). These solutions affect person-oriented instruments and significantly reduce the number of travels and visits needed in MNCs.

Chatbots and AI-driven conversation systems represent another dimension of digitalization's impact on coordination instruments. In internal IT support, for example, chatbots resolve routine queries from employees very efficiently. They diminish the need for person-oriented coordination by eliminating the human intervention.

They [chatbots] are incredibly good. They solve 80% of stupid queries like "I have no sound" or "I can't connect". That means it's an efficiency measure that really works. Because our IT backend is in Leipzig and you currently pay €30 per call, you've paid. Now you have a chatbot that is significantly cheaper in terms of licensing (Interview 1, para. 32).²⁰

These chatbots are also implemented across the global network of MNCs, dealing with various types of internal issues while translating the queries from and to different languages (Interview 8, para. 36). Such a solution enables seamless interaction in international companies and enhances technocratic coordination by standardizing decision-making processes.

In conclusion, digital technologies can profoundly influence the use of technocratic and person-oriented coordination instruments in international companies. By automating routine tasks, enabling centralized data-driven decisions, and enhancing communication tools, they strengthen

²⁰ Original Quotation in German: Die [Chatbots] sind gigantisch gut. Also, die 80% der blöden Anfragen wie „ich habe keinen Ton“ oder „ich kann mich nicht verbinden“ werden damit gelöst. Das heißt, das ist eine Effizienzmaßnahme, die wirklich „durchknallt“. Weil unser IT-Back-End ist in Leipzig und da zahlst du pro Anruf je 30€ aktuell, hast du bezahlt. Jetzt hast du einen Chatbot, der lizenztechnisch deutlich günstiger ist.

technocratic coordination, resulting in less importance of person-oriented instruments such as manager transfers and visits. Nevertheless, human intervention is still necessary to deal with strategic decisions as well as complex issues, especially in regard to cultural differences.

The results highlight the role of digital technologies in enhancing technocratic coordination instruments alongside reducing the need for face-to-face interactions to coordinate interdependencies across borders. In this regard, automation of tasks decouples humans from the process, which eliminates the need for human intervention and enhances technocratic instruments by standardizing processes. Moreover, digital communication and tools enable remote interactions, reducing the need for travels. Especially, technologies such as augmented and virtual reality allow the remote coordination of activities in specific cases. This is in line with previous research suggesting that augmented reality enables remote connection of experts with unskilled employees to perform maintenance tasks on-site (Masoni et al., 2017, p. 1302).

On the other hand, person-oriented instruments are more flexible to deal with complex issues and decisions in MNCs (Holtbrügge, 2005, p. 566), which makes them suitable for coordinating difficulties and issues occurred due to cultural differences such as resistance to digitalization among employees in different countries. Such issues are unlikely to be solved through centralization of decisions or standardization of processes. In addition, long-term strategic decisions usually need the involvement of various subunits and are typically subjected to complexity and dynamic environments that make the coordination of such interdependencies through technocratic approaches unlikely or difficult.

Ultimately, it seems that person-oriented coordination instruments have lost their importance in regard to routine operational business processes due to automation and communication advancements. In more complex decision-making, however, technocratic instruments may not be sufficient to cope with the needed coordination.

5.1.4.5 Knowledge Transfer

Digital tools and online meetings described in the previous section have also affected how international companies transfer knowledge across borders. Knowledge transfer relies on seamless exchange of information, skills, and innovations. In this regard, digitalization enables companies to transcend traditional barriers such as geography, language, and time zones, fostering an interconnected corporate ecosystem.

I can transfer knowledge much more easily very quickly [...]. I can exchange [information] with other experts in the network, in the group with other companies very quickly (Interview 8, para. 32).

To this end, regular virtual meetings and events are becoming commonplace to gather employees from different regions and facilitate information exchange and digitalization-related trainings among them (Interview 5, para. 16; Interview 14, para. 32). Such events, in addition to information exchange among team members, allow managers to provide information about certain performance metrics, technological advancements, and product demonstrations (Interview 14, para. 86). Each session of these events, which include various functional areas as well, is then recorded and uploaded to a central learning management system (Interview 4, para. 24). Such a learning system is typically an internal platform accessible from anywhere around the world, which facilitates cross-border knowledge transfer.

So, we do have an internal platform for knowledge sharing, that we build ourselves and also for onboarding engineers, so they know how to start and to learn. And next to that, we also have this platform where we have extensive documentation of everything, of all the processes, how the software works, how we work with each other and that is also international for everybody accessible and without that, we could just not do our work (Interview 14, para. 32).

Such an extent of knowledge sharing and transfer ensures that all employees, at least in their respective division, have the same information and remain aligned with the company's strategic objectives regardless of their location (Interview 14, para. 90).

Furthermore, the use of such platforms extends to conducting global lectures and webinars, in which employees are put in a virtual "classroom environment" in order to improve their knowledge (Interview 10, para. 50). To this end, companies' experts in specific areas prepare the webinars, which will be organized by the company and through the learning management system (Interview 14, para. 86). This can include global hybrid conferences organized for a week, once or twice a year and more often in smaller companies, by which physical and digital events allow participants to showcase their projects, share insights, and network (Interview 4, para. 24; Interview 9, para. 30; Interview 14, para. 46).

More interestingly, advanced technologies such as AI further enhance the benefits of the above-mentioned learning platforms by creating personalized learning programs, adapting content to suit employees' requirements, and providing real-time feedback (Report 36, Company 4, 2023,

para. 6). Moreover, gamification is another solution to improve employees' skills through learning platforms. For instance, Company 8 conducts an internal virtual game, by which the employees of each subunit create a team, play against other subunits, and increase their advisory skills as sellers (Report 47, Company 8, 2023, para. 3).

In the same way, the integration of augmented and virtual reality has redefined training paradigms in international companies. One of the use cases of these technologies is to remotely transfer knowledge from experts in HQ to low-skilled employees in different locations (Interview 7, para. 23; Interview 8, para. 34). For instance, Company 7 uses the technologies to train local technical employees in production for modification, repairing, and operation of machines regardless of location and time (Report 62, Company 7, 2023, para. 6). Similarly, Company 1 benefits from virtual reality to introduce global employees to new automobile structures and practice assembly in production (Report 30, Company 1, 2021, para. 12). And finally, Company 11 implements the technology to support the training of logistics specialists by providing a virtual world of all containers and parts, eliminating the need for real components as was necessary before, and overcoming distance and language barriers, which enables knowledge transfer between global subunits (Report 10, Company 11, 2021, para. 59–62).

In conclusion, digital technologies facilitate cross-border knowledge transfer in international companies. From remotely connecting experts and local employees through digital platforms to revolutionizing training with advanced technologies, digitalization not only overcomes traditional barriers, but also creates new opportunities for innovative learning processes. Nevertheless, companies' strategies and culture also seem to play a role. As an illustration, Interviewee 5 as the top-manager responsible for digitalization of his respective MNC, did not trust advanced technologies such as AI for remote training and preferred a traditional log-term approach, by which local employees are brought to the HQ to be trained (Interview 5, para. 19). Such approaches can diminish the advantages of digital technologies for knowledge transfer.

The results indicate that the use of digital technologies increases the efficiency of cross-border knowledge transfer. This is done by reducing the need for face-to-face information exchange (Bucher et al., 2024, p. 1792). The elimination of face-to-face interactions through digital technologies enables MNCs to overcome geographical barriers while the use of internal platforms facilitates the online transfer of knowledge regardless of time. This allows for rapid adaptation of learning processes according to the changing business needs, which is in line with dynamic capability view's principles. Such central platforms also reduce the coordination costs by eliminating the need for travelling to other locations, which further increases efficiency.

Furthermore, it seems that new advanced technologies such as augmented and virtual reality enable MNCs to easily transfer tacit knowledge across borders. This is especially applied in production and logistics as demonstrated in this section and implies that the transfer of tacit knowledge does not always require moving people to other locations, even though such knowledge is embedded in human beings. This finding is in contrast to previous suggestions that tacit knowledge can only be exchanged through relocations (Biggiero, 2006, p. 456). The reason for such contradictory results lies in the ability of the above-mentioned technologies to create a world, in which both the expert (the employee with the tacit knowledge) and the local unskilled employee can work simultaneously in a virtual world representing of the real one, allowing them to exchange knowledge as if they are in the same place working with the same physical objects. Such an ability is different from online meetings and has only become possible in recent years due to advancements in augmented and virtual reality. Nevertheless, more complex knowledge such as management capabilities is likely to still need the relocation of employees across MNCs' global network because digital technologies are not yet able to illustrate a virtual world suitable for such capabilities.

Finally, internal platforms for knowledge sharing are crucial for IT professionals working remotely for international companies. As was evident in Company 14, such platforms serve as a tool for linking global IT professionals from around the world and enable learning opportunities for them. This is important, since providing learning opportunities is critical to attract and retain digital expertise (Grimpe et al., 2023, p. 678). Similarly, other international companies are also benefiting from the advantages of learning platforms to enhance their employees' capabilities.

5.1.4.6 Partnership and Acquisition

In the contemporary dynamic international business, partnership with other companies alongside acquisition of often startups are seen as a necessary step towards success and gaining competitive advantages. Strategic collaborations enable companies to leverage each other's strengths, extend their market reach, and adapt to the challenging demands of international business. As a consequence, more and more companies from around the world are engaging in such partnerships and are searching for technology providers.

By doing this, international companies can leverage a variety of advantages, including the access to advanced technological capabilities, improved operational efficiency, and entering new markets. For instance, Company 1 has partnered with Nvidia to create real-time digital twin simulations of its global manufacturing sites (Report 23, Company 1, 2023, para. 2). Similarly, Company 5 has benefited from the technology of one startup to connect and control its global

manufacturing sites through cloud (Report 37, Company 5, 2022, para. 5). The global implementation of the acquired technological capability through such partnerships and acquisitions can further enhance competitive advantages of companies in various markets, especially in regards to digital solutions intended for direct engagements with customers.

While we were able to acquire this specific company [a startup providing a leading technology for recruitment], I was able to hit two flies with one strike: Entering the [US] market and also exactly in this order to get hands on the most attractive new online recruitment technology globally. [...] We used this technology and developed now in a kind of, it's still in the test phase, for [the] UK and Germany (Interview 9, para. 30).

However, these acquisitions can cause disruptions against digitalization efforts due to different corporate cultures and business processes. As described before, harmonization and standardization of international activities are crucial for digitalizing business processes. Since newly acquired companies or external partners have usually different organizational and operational structures, the harmonization of processes takes considerable efforts, which in Company 5 has already proved to be an issue (Interview 5, para. 2). Similarly, the acquisition of several online job matching platforms in different markets has prevented Company 9 to implement a global digital platform as their main product, reducing operational efficiency (Interview 9, para. 4). Such an issue is likely to intensify when the acquired company is located in another country with a different business and cultural environment.

Nevertheless, partnerships are commonplace in many business areas, bringing competitive advantages for companies. One reason for such an increase in partnerships is that it is now easier to initiate partnerships across the globe due to the connectivity provided by digital technologies, and it is also easier to end or decrease the degree of the partnership when necessary (Interview 13, para. 54). This gives international companies a certain level of flexibility. For instance, partnering with public cloud services such as Amazon Web Services allows international companies to avoid local investments in data centers and gives them the flexibility of scaling up or scaling down their cloud-related operations in different regions because the company does not own the digital infrastructures (Interview 14, para. 72). The flexibility increases the efficiency of managing and coordinating international activities by allowing international companies to adapt their global resources according to the changing business environments.

On the other hand, such reliance on external partners can make the company dependent on the technology provided by the partner (Interview 2, para. 22; Interview 14, para. 48). This is crucial for international collaborations with global technology companies. The reason lies in the fact that most of such technology partners are headquartered in the USA, which makes European and Asian companies subject to the country's business landscape (Interview 7, para. 33; Interview 8, para. 49), including political and regulatory frameworks.

The only thing, what is probably a bit different, is that we are also really dependent on external... like on non-European, on non-German products, like our whole infrastructure is all run by Google and by Amazon, so AWS [Amazon Web Services], because there is no such a product in Germany. And that is a big, big bottleneck. I worked in several different companies, always more or less in the South area. There is no good German or European product that can compete with Google, AWS, and all the other big names that are from the US. That means, if the political climate changes in the US, then that could potentially be a big, big issue for a lot of tech companies in Europe (Interview 14, para. 68).

The dependence makes the management of GVCs more complex, since the lack of local or regional technology providers hinders the MNCs' agility. This can also force European companies to accept their US partners' conditions (Interview 10, para. 40), which is critical due to their different visions of digital product development (Interview 8, para. 49).

In addition, the reliance on external partners, especially in foreign countries, can also increase the vulnerability of international companies due to data sharing among partners (Interview 11, para. 44). Since the data exchange between business partners is vastly extended and is also necessary, data leaks and IT-related issues in one side of the partnership make the other side also affected. This is especially crucial in case of international partnerships, since countries have typically different regulations for data privacy and IT security. As an illustration, Company 6 had to deal with data leaks from one of its technology partners in Poland, which was subject to such differences (Interview 6, para. 14).

Another restricting factor for global partnerships refers to political and regulatory frameworks. This plays an important role especially in China, since partnerships with local companies are in many cases mandatory rather than an optional approach to maintain competitive advantage. To illustrate, companies' digital solutions and digital platforms have a different set of technology

partners in the country compared to the rest of the world (Interview 2, para. 14). Western companies also have to partner with Chinese companies in order to develop autonomous driving algorithms (Interview 1, para. 42). Since the country represents one of the key markets for many Western MNCs, they typically go through the extra efforts to integrate different services in China and engage in partnerships with local technology providers (Interview 11, para. 34). This means that while most MNCs rely on US-based technology partners for their digital solutions in many parts of the world, they must have Chinese technology providers such as Alibaba, Tencent, and Baidu as their partners in order to enter the Chinese market and operate there (Interview 6, para. 14; Interview 10, para. 44; Interview 13, para. 52).

These differences in global partnerships make the management and coordination of international activities more complex because business processes cannot be harmonized across all markets. Different companies have typically different business processes and structures. As a consequence, the change of technology partners across markets forces MNCs to adapt their processes accordingly, which hinders a global and standardized approach for deploying digital solutions and hence, the coordination of business processes becomes more challenging. Nevertheless, this change in partnerships is crucial in key markets such as China.

In conclusion, global partnerships and acquisitions of startups are essential to navigate the increasingly interconnected world of international business. They enable companies to expand into new markets, access innovative technologies, and drive growth by gaining competitive advantages through external expertise. However, challenges and risks associated with such partnerships and acquisitions complicate the management of international activities, ranging from difficulties in harmonizing global business processes to dependence on non-regional external partners.

The results demonstrate the importance of partnerships in the digital era as well as their associated challenges. The increasing trend towards partnerships can be explained by the reduction in transaction costs stemming from the extensive digitalization of processes, which makes changing the status of partnerships easier, as described in this section. The resulted flexibility then enhances dynamic capabilities of international companies to respond quickly and according to the business environments. The externalization of GVC activities may play a role to provide such flexibility, since internalization, as the opposite approach of externalization, is tied with FDI, making MNCs bounded to specific processes and markets. Moreover, it seems that current GVCs have more independent companies and external partners involved in their value creation, highlighting the horizontal integration of partners (Hernández & Pedersen, 2017, p. 140), which

again supports the idea of externalization as an explanation for the above-mentioned flexibility. This can also explain the IT security risks emerged from the extensive collaborations between international companies and their suppliers. If suppliers were vertically integrated into the GVCs more frequently, MNCs would be likely less affected by data leaks and IT problems of their suppliers.

Finally, specific regulations in China significantly influence partnerships of MNCs in the country, similar to their impact on various other aspects of international business, as demonstrated throughout this chapter. This means that the local responsiveness needed for operating in the country is not limited to adapting products and digital solutions, but it encompasses a wide spectrum of companies' international activities. In this regard, business relationships and strategic approaches of MNCs are also affected in the way that it should be decided with which partners and suppliers they want to cooperate.

5.1.4.7 Coordination of Functional Areas

Digitalization has altered many business processes in international companies. However, this change is not equally spread over all business areas. As a result, the digital maturity of functional areas varies remarkably when put against each other, and more notably across industries. This is important for MNCs because the processes of each functional area become more standardized if the functional area is more digitalized and advanced, which in turn enables MNCs to centrally coordinate activities and increase efficiency.

In this regard, marketing and sales are believed to be impacted the most. This makes sense because most data are gathered in marketing, where the interaction with customers is the center of activities. Especially in the retail and e-commerce industry, MNCs are able to track customers' interactions and understand their behavior in all foreign markets (Interview 8, para. 28). This is contrary to the past, where traditional marketing strategies were often limited by geographical boundaries and the capacity to gather real-time customer insights, whereas digitalization has enabled a central approach, by which new marketing tools bring local data together and facilitate a more efficient way of analyzing the data (Interview 8, para. 30). In contrast, the automotive industry illustrates a different pattern, by which national companies and representatives play an important role in determining marketing strategies, influencing the digitalization of the MNC as well (Interview 11, para. 14). Interviewee 1 shed light on the reason behind this difference.

So, marketing and sales have the most data, but to be honest, that's where the coordination between the head office and the markets is the worst because sales function doesn't want the head office to have more insights into sales data and how campaigns are running, etc., and they also, quite rightly, don't necessarily see any added value for themselves if things become more and more centralized and the head office has more and more exchanges and sees more data (Interview 1, para. 44).²¹

The reason for the above-mentioned differences likely refers to each industry's characteristics. Whereas the retail and e-commerce industry usually operates through stores dependent on the HQ and also online, which gives companies the ability to remotely gather insights, automobile manufacturers typically sell their products through independent entities in local markets, which can complicate the coordination of activities between the HQ and national entities.

Conversely, the coordination of international activities is very efficient and intensified in regards to production and also logistics due to just-in-time approaches enhanced by digitalization (Interview 1, para. 44; Interview 11, para. 14). Smart manufacturing technologies and the implementation of IoT devices and sensors have enabled MNCs to gather more information and detailed insights about global supply chains. More importantly, the afore-mentioned central IT systems, such as an integrated global ERP system, enable MNCs to centrally govern global interactions in this regard. By using such digital tools, manufacturing companies are able to centrally organize their global production and determine, for example, in which plant which product should be manufactured in order to increase efficiency and reduce costs (Interview 1, para. 44). The more central coordination in production and logistics is also understandable in the way that these functional areas are less subjected to direct interactions with local customers, which makes the involvement of local subsidiaries and entities less necessary.

Procurement is also another functional area affected significantly by digitalization. The automation of processes in procurement through advanced technologies such as blockchain has enabled MNCs to increase efficiency and transparency (Interview 2, para. 33), and has allowed them to coordinate interdependencies across the global network of suppliers.

²¹ Original Quotation in German: Also, im Vertrieb und Marketing gibt es die meisten Daten, da ist aber ehrlich gesagt die Abstimmung zwischen der Zentrale und den Märkten am schlechtesten, weil der Vertrieb nicht will, dass die Zentrale mehr Einblick bekommt in Vertriebsdaten und wie Kampagnen laufen usw. und die auch, ehrlicherweise berechtigt, keinen Mehrwert zwingend für sich sehen, wenn das immer mehr zentralisiert wird und die Zentrale immer mehr Austausch hat und mehr Daten sieht.

I mean for example in procurement, I think we are quite advanced. We use a high degree of automation, and we use tools for purchasing, [by which] suppliers for example, at the end of the day, they don't know that they are dealing with machine and not with a human being in the background (Interview 5, para. 21).

Such automation facilitates the coordination of global suppliers by eliminating the need for the involvement of local representatives in order to initiate contacts with suppliers, since the process is automated by blockchain and can be conducted centrally by the HQ.

More interestingly, the digital maturity of human resource function seems to vary across international companies. While the functional area may be the least advanced one in terms of digitalization in specific companies (Interview 2, para. 31), human resource is “strongly digitalized” in Company 13, from recruitment to retirement processes (Interview 13, para. 22). This probably makes sense for this company with more than 300.000 employees across the globe. The coordination of activities for such numbers of global employees with different cultures and languages requires a vast amount of automation compared to smaller MNCs.

Furthermore, digital tools and data gathering in finance as a functional area are crucial for international companies' operations (Interview 13, para. 20). Many processes are digitalized and automated in finance, such as automated financial reporting, real-time analytics of financial data with AI, or the use of blockchain technology to enhance transparency and security in financial transactions. In this regard, finance is tied with taxes and legal aspects, which are highly localized due to the differences in countries' regulatory frameworks (Interview 11, para. 17). Digitalization helps streamline the gathering of financial data from foreign markets. However, the localized nature prevents the implementation of a global standardized solution.

If you then look for example into the finance community, just as an extreme of interaction, the finance community has to let's say consolidate our results every month, right? So, because every country is having his own financial results in the different dimensions, then you have the consultation process. That's also an intense work, where all the wanted systems feed the data automatically. But then you have a lot of let's say interrogation of the data, if it's understood well. So, you have then also again an intense conversation of the controllers of the central unit with the countries to make sure that the data is let's say properly understood, that there is no mistake in there, so the quality control is then also happening (Interview 8, para. 30).

This suggests that a high degree of coordination and information exchange is needed between the HQ and foreign subsidiaries. Nevertheless, this coordination is not automated or standardized due to local differences. Indeed, it is difficult to follow a one-size-fits-all approach when local regulations play a role in digitalization (Interview 13, para. 24). This makes those functional areas significantly subjected to local regulations, such as finance, less advanced in terms of the global coordination and standardization of processes, even though they may implement a vast array of digital solutions to increase the efficiency of their operations.

In conclusion, the degree of standardization and global coordination of activities varies across functional areas and in different companies. While most data are available in marketing, it seems that production and logistics are the functional areas with the most standardized and centralized coordination of global processes. A certain degree of standardization can also be seen in procurement and human resource management. On the other hand, functional areas that are subject to local regulations are unlikely to benefit from efficient coordination resulted from standardization of business processes.

The results highlight the advancement of production and logistics in terms of global coordination. This is in line with previous findings suggesting that production and human resource management are among the more advanced business functions (Stawiarska et al., 2021, pp. 14–15). The advancement of human resource management in Company 13 is explainable by the size of the company, which was also highlighted by the above-mentioned study as an important factor to assess the digital maturity of functional areas.

Finally, the local responsiveness is necessary in regard to local regulations, which makes the standardization of processes and hence the global coordination of activities difficult. A global approach is more likely in functional areas, where the need for local adaptation is less necessary. To this end, production or logistics are less bound to local regulatory frameworks compared to marketing and sales, allowing for a high degree of coordination through digital solutions.

5.2 Final Discussion of the Results

In previous sections, the impact of digital technologies on each of the four research categories was demonstrated, as the results of analyzing the qualitative data. In this regard, several relevant aspects were thoroughly discussed and it was attempted to shed light on their role in affecting companies' international business activities. This section will summarize the aspects and will provide an explicit answer to the four research questions introduced at the beginning of this dissertation.

The first research question aimed to clarify how and to which extent the use of digital technologies influences companies' location of international activities. The influence is mostly showcased through flexibility in location choices, technology hotspots and their selection criteria, flexibility in the location of employees due to remote collaborations, and the need for foreign footprints despite of digitalized processes. Regarding the first aspect, digital technologies themselves are usually not a key factor in decisions on where international activities should be conducted. However, they provide a certain level of flexibility and freedom for MNCs. For instance, a Belgian manufacturing company may want to locate its new production facility and may have several options to choose, such as China, Hungary, or South Africa. The key factors to choose between these places are still production and logistics costs, labor costs, etc. Nevertheless, the distance between the home country and, for example, South Africa may not be as important as before because companies are now able to connect their global production facilities and their global assets through digital solutions such as ERP systems, which provides them with flexibility. Thus, South Africa may represent itself as a viable choice for the company.

Moreover, the remote collaboration between global employees further increases this flexibility. Many MNCs are now locating their business functions in different places. For example, an Italian company may locate the hub of its marketing in Spain, or a German company may choose Hungary as the center of finance for all financial activities in Europe. Such flexibility, which was highlighted by the studied companies as mentioned before, is only possible due to digitalization and the connectivity between places, which allows employees in different locations to work collaboratively without being in the same location.

In terms of technology hotspots and their selection criteria, new technology hubs have been emerged in recent years, with Portugal being the most surprising one. These hubs offer digital talent pools, especially in IT development, which are typically associated with local education systems and investment strategies. Interestingly, labor cost is considered as an important criterion for selecting the suitable IT hotspot. MNCs are usually looking for hotspots which can provide adequate digital talents alongside lower wages, making locations such as Portugal, Spain, India, and Brazil as attractive destinations for IT development.

When it goes to foreign footprints, the assumption for international operations through lighter asset footprints is largely denied. Although digitalization allows for a certain level of reduction in physical assets, for example due to remote working or digital platforms, the need for physical presence is indispensable, especially for physical products such as automobiles, whose production requires a remarkable footprint in different locations. Therefore, the assumption remains

viable only for very specific business models such as the one from Netflix. More importantly, local regulations force MNCs to be present in specific markets, especially in China.

The second research question referred to how and to which extent the use of digital technologies influences companies' internationalization decisions in general. In this regard, digitalization changes the global and local competition landscape, market adaptation paradigm, and decision-making processes. Geopolitics and regulations are also critical factors for internationalization decisions in the digital era. More specifically, China as one of the key markets comprises most of the above-mentioned aspects, significantly affecting companies' internationalization-specific decision-making. To illustrate, digitalization allows smaller companies to develop innovative solutions and compete with more established MNCs. The technological advancement of China has enabled Chinese companies to arise as new competitors and change the competition landscape.

Regarding market adaptation, digitalization-related regulations such as data protection laws in different regions significantly affect companies' international activities and force them to adapt their digital solutions accordingly. As an illustration, GDPR in Europe poses strict boundaries to storage, process, and usage of data in the region, limiting what companies can do with new innovative solutions based on collected data. Such regulations prevent an integrated development of IT solutions for global markets and are considered as one of the most important barriers by many international companies. Moreover, national regulatory frameworks also necessitate local adaptation of digital solutions. China with its unique regulations plays a crucial role in this regard because the country represents one of the key markets for many Western MNCs. In addition, geopolitical tensions and relationships, such as the one between the USA and China, require more localized approaches necessitating adaptation of IT development to each market's business environment.

Decision-making processes are also affected by digitalization in the way that digital connectivity enables real-time and collaborative decision-making across borders, since stakeholders such as employees of a functional area or managers can be integrated into one platform, which allows, for example, for an approval process involving local managers from different locations to be done collaboratively and remotely.

The third research question was about how and to which extent the use of digital technologies influences companies' foreign subsidiaries and their roles. Their roles are mostly indicated in their involvement in IT development as well as acquiring local digitalization-related resources.

The involvement of foreign subsidiaries is multifaceted. To begin with, digital pilot projects can be initiated from subsidiaries. This is dependent on how advanced the foreign subsidiary is in terms of IT development and the availability of digital talents. Especially, subsidiaries of MNCs in China can play an important role due to the local talent pool, digital infrastructure, and the importance of the market itself. Second, foreign subsidiaries serve as contact points in local markets and can be involved in the acquisition of and partnership with local startups who can provide innovative technologies. Third, the feedback from subsidiaries is crucial for IT development, since they are familiar with local markets and their specific preferences. As a result, their needs have to be considered in the development of digital solutions as well in order to ensure sustained competitive advantages in each market, especially in more important markets. And finally, the adaptation of digital solutions to foreign markets requires local expertise familiar with each market's characteristics, highlighting the role of foreign subsidiaries in providing such expertise.

In regard to acquiring local resources, foreign subsidiaries are responsible for integrating local digital services into MNCs' global network. This network can include business-to-customer digital platforms as well as internal IT systems. For the former, different complementary resources are needed in different markets. For instance, the adoption of digital payment services varies across Germany and Spain. In terms of internal IT systems, services such as public cloud can be mentioned. In this regard, different service providers have to be used in China due to its strict regulations. In fact, Chinese regulations even restrict access to specific technologies such as AI algorithms, forcing MNCs to establish joint ventures in the country in order to acquire the technology. To this end, subsidiaries in the country are extensively involved in the process.

Finally, the last research question intended to demonstrate how and to which extent the use of digital technologies influences companies' governance, management, and coordination modes. This research question probably represents the most affected area by the use of digital technologies in regard to international activities. As a consequence, various aspects of governance and coordination modes were discussed. However, they can be summarized in standardized processes, digital connectivity facilitating interconnections, central IT systems, centralization-decentralization paradigm, less need for person-oriented coordination in routine operations, more efficient knowledge transfer, disruptions in global coordination due to partnerships, and different levels of digital maturity in functional areas.

In this regard, data and resource management systems provide a tool for MNCs to manage their global interdependencies. Especially, central IT systems enable them to control and coordinate

interactivities. For instance, ERP systems facilitate the management of manufacturing sites alongside logistics from around the world by connecting all resources and assets, data sharing platforms enable information exchange among stakeholders from anywhere, and digital working platforms allow for collaborations among global teams. These solutions reduce coordination costs of international interdependencies when global stakeholders are involved. Moreover, such platforms connect employees from around the world and enable remote knowledge transfer, further highlighting the advantages of digitalized coordination.

Regarding person-oriented coordination instruments, digital technologies automate many processes, which eliminates human intervention and hence, the need for such coordination instruments. Since most of automated processes refer to routine day-to-day operations, the effect is also mostly regarded to such operations rather than more complex decisions.

As can be seen, most of the above-mentioned aspects refer to how digitalization makes processes automated and standardized, and how connectivity enables the central coordination of activities. These two are the backbone of digitalized governance and coordination. To illustrate, technologies such as ERP systems, robots, data sharing platforms, and chatbots can automate or standardize processes. On the other hand, internet and communication technologies such as the internet, cloud, or IoT connect devices, people, and locations, enabling the cross-border transfer of digital solutions and knowledge. As a result, international companies can orchestrate their global business processes more efficiently through a centralized governance and coordination system. Nevertheless, national regulations and the need for local adaptation hinder a fully centralized control over activities, which emphasizes the enhancement of central-decentral paradigm in regard to the management of international activities. This paradigm is specifically seen in different functional areas, whereby the ones less subjected to local regulations such as production can benefit more from central governance, whereas the other functional areas such as finance are more affected by national regulations.

This means that although digital technologies enable new forms of central governance through a digital network connecting locations and activities, a high level of coordination and cooperation with local entities is still needed due to regulations being the most important barrier of an integrated approach. This probably results in a power balance between HQ and subsidiaries, since a fully centralized governance system would allow HQ to control every activity in GVCs. Moreover, digitalization should also provide local managers with more data to make specific decisions without the need for the involvement of HQ.

As indicated in previous sections and highlighted above, geopolitics, regulations, and digital platforms have been found to be crucial factors in terms of their impact on digitalization efforts of international companies. At the beginning of this chapter, it was noted that these factors have influence on all four research questions. This influence was explained during the discussion of each research category. To summarize the findings in this regard, table 7 demonstrates the relevant aspects of the above-mentioned factors under each research category.

Table 7: The Role of Politics, Regulations, and Digital Platforms

Research Categories	Political Circumstances and Regulatory Requirements	Ecosystems and Digital Platforms
Location of Activities	The role of economy, digital infrastructure, incentives, and universities of individual countries; necessity of diversifying locations in regard to IT development	The need for foreign footprints in case of within-country network effects, and especially for physical products
Internationalization-specific Decision-making	Necessity of adapting IT solutions locally due to geopolitical tensions (e.g., the China-US relationship), and due to regulatory frameworks (e.g., in China as an important market)	Difficult to establish national digital platforms; competition from Chinese manufacturing companies due to high levels of technology integration
Foreign Subsidiaries and their Roles	Necessity of joint ventures to have access to digital technologies (e.g., autonomous driving licenses in China); the need for local experts to integrate local digital solutions	The need for local complementary resources (e.g., WeChat in China instead of Spotify), and also for contact persons and local experts to integrate those resources
Governance, Management, and Coordination	Complicated coordination due to the political situation between China, Europe, and the USA; restrictions in global data storage and data transfer	Direct feedback from developers, suppliers, and customers; physical products as a digital hub

In addition to the above-mentioned aspects summarized and discussed under each of the four research categories, it should be noted at this point that industries and their specific characteristics can also play a role in explaining the impact of digital technologies on companies' international activities. This research project included companies from different industries, from automotive to chemical industries, or online businesses. Although most of these industries indicated similar impacts of digital technologies in regard to international business, occasional differences can also be spotted when referring to specific aspects. Most differences refer to how digitalized the industry is or how important digital solutions have become for the industry. This implies the differences between traditional manufacturing companies and online businesses, typically traditional MNCs and digital INVs, as indicated in the beginning of this dissertation.

The differences between MNCs and INVs in regard to location of activities refer to the point that manufacturing companies have typically heavy presence in foreign countries through production plants and distribution channels, which are associated with producing and selling physical products. On the other hand, digital companies need far less foreign footprint, since their GVC is mostly digital and can be conducted remotely. However, physical presence is also necessary for such companies depending on their business model and due to national business environments, as described in previous sections. For instance, a mobility service provider has to connect its software with physical assets such as e-scooters and also needs contact points to authorities in local markets, highlighting the necessity of local presence, even though this presence is lighter compared to traditional manufacturing companies.

In terms of internationalization-specific decision-making, traditional MNCs are increasingly challenged by newcomers in different countries. The reason lies in the fact that physical products are increasingly becoming the hub of platforms, whereby digital services from external partners are integrated into the product, meaning that digital services are becoming more important than the product itself. A promising example of this trend is software-as-a-service solutions observed in various industries such as healthcare equipment, drones, and production robots, where local manufacturers, especially in China, are gaining more attraction and market share due to their digital advancements. For digital INVs, it seems that regulatory frameworks are more of a challenge than newcomers emerging from local markets. This is especially the case in China, where most of Western digital services are prohibited. Moreover, business processes of digital INVs in most industries are not fully digitalized, including the two digital INVs in this research project, and need to be linked to physical products or within-country elements such as the job-matching market with its national characteristic. This makes the internationalization of such companies more difficult.

The comparison between traditional MNCs and digital INVs is challenging when it is about foreign subsidiaries and their roles, since digital companies usually operate through offices in foreign countries and do not typically have foreign subsidiaries in the same way as traditional MNCs have. As a result, the difference between the two forms is limited.

Regarding governance, management, and coordination, both company forms benefit from digitalized governance and coordination, although differently. For manufacturing MNCs, a large part of their international operations is still tied with non-digital processes and assets located in different countries. Digital tools enable them to connect these assets and coordinate interdependencies efficiently. Digital INVs, on the other hand, implement digital platforms to centrally

control activities, meaning that such companies tend to centralize more business activities in their GVC compared to traditional MNCs.

Ultimately, it can be concluded that the use of digital technologies has led to more flexibility in regard to location of activities, has increased the competition in global markets alongside the need for local adaptation due to local regulations, has highlighted the involvement of foreign subsidiaries in IT development, and has enabled more efficient governance and coordination of international activities. These impacts are largely represented in different industries; however, when specific aspects are considered, industries can vary based on how digitalized they are. Nevertheless, the advantages of implementing digital solutions remain the same for most of international companies.

6 The Relationship between Digitalization and International Activities

The previous chapter provided an extensive description of the relevant aspects extracted from the text material. These aspects represented the impact of digital technologies on international activities demonstrated through the introduced codes. Each code was assigned to one of the research categories, as illustrated in figure 3. After this step, a contingency analysis was conducted to investigate possible relations between the codes. This analysis and the examination of how often one specific statement is categorized under different codes (overlapping of codes) revealed more insights into the interconnections between the codes, both within and across the four research categories, providing a general picture about the impact of using digital technologies in international companies. Based on this general picture, a model and a theory will be introduced in the following sections, attempting to illustrate the interconnections between digitalization and international activities.

6.1 The Model of Digital Impact in International Companies

The examination of similar words related to each code hints at specific patterns within each research category. These patterns can be showcased in a model of digital impact in international companies, which is shown in figure 4. In the model, three aspects are demonstrated under each research category, including scope, impact, and drivers. The scope distinguishes between global and local, indicating whether digitalization-related business processes are occurred at a global or local scope. The impact assesses the overall influence of using digital technologies in respect to the research category based on the relevant aspects discussed in the previous chapter. Finally, the drivers determine what the main cause or enablers of the above-mentioned impact are; in other words, what triggers the impact in regard to each type of cross-border activity in international companies.

The scope of business processes for “location of activities” is global, since the category is about the search for locations, talents, collaborative working, and the general foreign footprints, which all are happening at a global scope. For instance, when searching for technology hotspots, companies are looking at global markets and this search is not bounded to national borders. Similarly, the search for talents is global, since companies are looking for IT specialists around the world without concentrating on specific locations or countries. The impact of digital technologies on such a global scope is then the flexibility they can bring due to digital connectivity between locations. As discussed earlier, MNCs are now more flexible to choose between different locations, since they can connect new locations with their global network. This is also

the case for choosing digital hotspots and locating digital talents because these resources can also be integrated into global networks by exploiting the advantage of remote working. Moreover, it was stated that foreign footprint is still needed for international activities; however, traditional MNCs can reduce their footprints in specific areas such as administration offices due to connectivity and remote working, while digital INVs benefit from their digital business to have lighter asset footprints compared to manufacturing MNCs. As a result, the main impact of digital technologies on location of international activities can be concluded in the flexibility that they provide to international companies. The driver of this flexibility is the connectivity between locations resulted from the use of digital technologies.

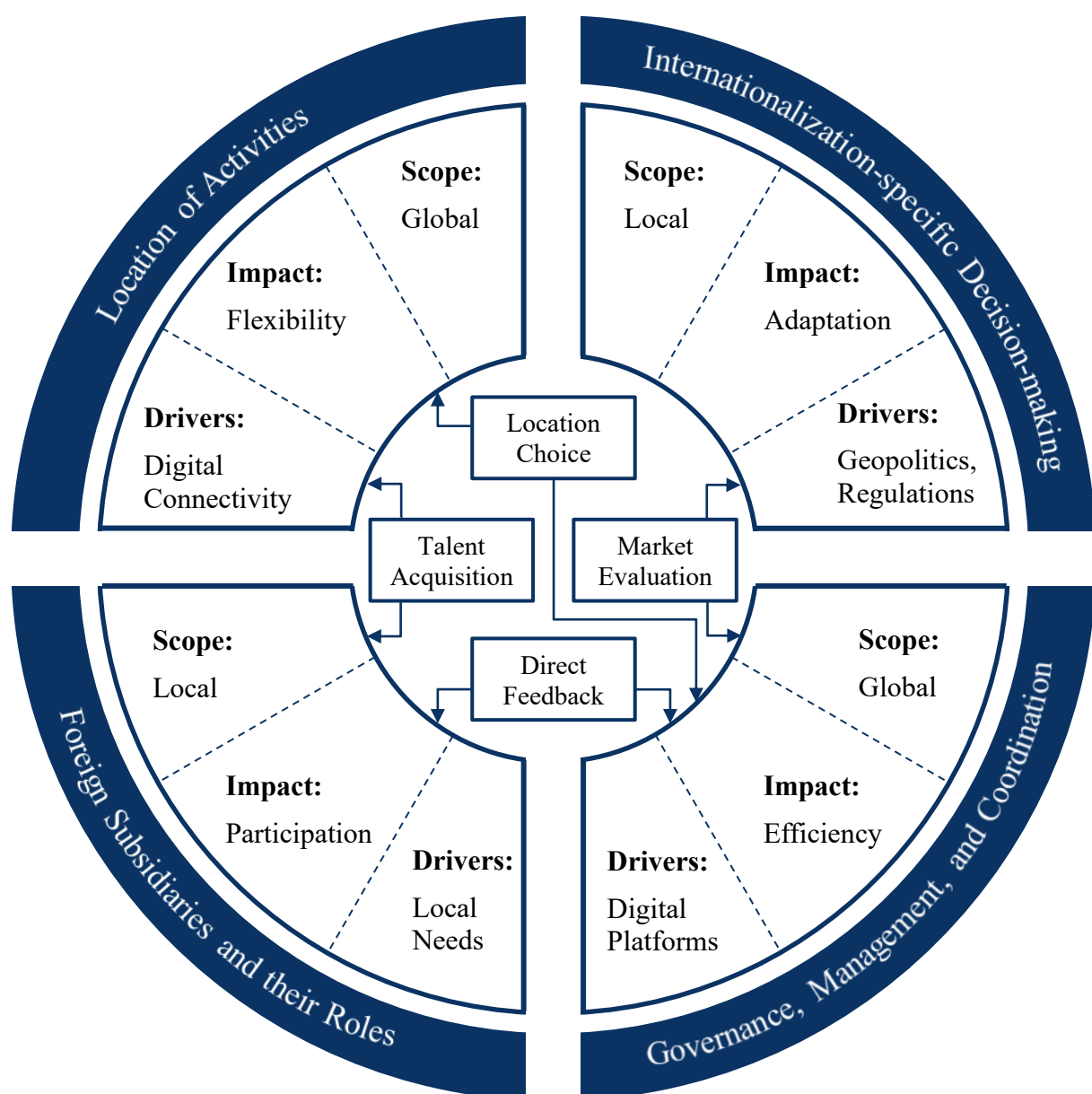


Figure 4: The Model of Digital Impact in International Companies

In contrast to the previous research category, the scope of activities for “internationalization-specific decision-making” is local, since it mostly refers to market presence and market adaptation, which are associated with local markets and hence localization. The impact of digital technologies on this association with local markets is digital adaptation needed for being present and competitive in the market. Previously, it was noted that the competition in local markets is increased as the result of extensive digitalization, and newcomers are arisen, especially in China. This is partly due to domestic policies of countries, investing in education systems and supporting their startups. Moreover, the need for local adaptation of not only digital products but also business processes was also highlighted. This need largely stems from political situations and local regulations, forcing international companies to be compliant locally. As a result, the main impact of digital technologies on internationalization-specific decision-making can be named digital adaptation, pointing at the uniqueness and challenges of such an adaptation. Its uniqueness relies in the fact that global approaches are easily achievable in regard to digital products and solutions; however, geopolitics and regulations serve as barriers against such an approach and dictate local adaptation, meaning that the main drivers of digital adaptation seem to be geopolitics and regulations, whereas for traditional non-digital products, local preferences in foreign markets are usually and mostly the drivers of local adaptation.

The scope of operations for “foreign subsidiaries and their roles” is also local, since this category mostly represents the participation of subsidiaries in IT development, which is bounded to national borders of countries. More specifically, this participation refers to providing local expertise for local adaptation of digital solutions, serving as contact points for talent acquisitions and partnerships with local suppliers, ensuring access to local complementary resources, and giving feedback about their digital needs. These aspects typically occur within the boundaries of foreign markets. More importantly, these aspects suggest that the main impact of digital technologies on foreign subsidiaries is their participation in IT development. The drivers for such a participation are each market’s needs, preferences, and business environment, which necessitate the availability of local expertise familiar with the local market, hinting at the role of foreign subsidiaries in this regard.

The scope of activities for “governance, management, and coordination” is global, since this category implies the interactions and interdependencies among global stakeholders and within the global network of international companies. Therefore, it is not bounded to national borders and points at its global occurrence. The impact of digital technologies on management of such global interrelatedness is the increased efficiency of coordination. As indicated before, digital

technologies help international companies reduce coordination costs by standardizing business processes and reducing human interventions. Moreover, international companies are increasingly implementing data and resource management systems to connect and integrate global assets and stakeholders, which enable them to facilitate the coordination of subunits and functional areas, foster cross-border knowledge transfer, and enhance person-oriented coordination instruments. As a result, digital technologies can significantly increase the efficiency of governance and coordination modes, which is achievable by streamlining business processes across borders. The main driver of this efficiency is the implementation of digital platforms. Since digital platforms are becoming the cornerstone of many activities, they are changing international companies' global coordination approaches. Such platforms not only connect and integrate stakeholders and suppliers from around the world, but they also provide powerful mechanisms to control and govern them centrally. Thus, they can reduce transaction costs and increase efficiency in regard to interactions within companies' global network.

In addition to the above-mentioned relations between codes within each research category, specific codes demonstrated interconnections to each other across the four research categories. As illustrated in figure 4, location of activities is interconnected with foreign subsidiaries through talent acquisition. MNCs are searching for digital expertise around the world, especially in technology hotspots. In many MNCs, local subsidiaries are usually responsible for this search. More importantly, hiring digital talents requires local contracts in each market, which can again highlight the role of subsidiaries as the entity familiar with local working environment and regulatory frameworks. Moreover, MNCs typically have or establish their own subsidiaries in technology hotspots to benefit from the expertise and talent pool in such locations. Overall, foreign subsidiaries are the contact point to local talents and are actively involved in the process of digital talent acquisition.

Location of activities is also interconnected with governance and coordination through the relation between location choice and the coordination of subunits. Previously, it was indicated that MNCs are now more flexible to choose between locations due to the connectivity emerged from digital technologies, which allows for linking GVC activities regardless of their location. In this regard, digital platforms and central IT systems enable MNCs to facilitate coordination between global subunits. For instance, digital solutions for production assembly lines can be developed centrally in the home market and then be spread over global manufacturing sites with the push of a button via cloud technology. This enhanced management and coordination of GVC activities provides MNCs with flexibility in regard to location choices, as described in the

previous chapter. As a consequence, digitalized governance and coordination tools can influence the location of international activities.

Furthermore, internationalization-specific decision-making is interconnected with governance and coordination through market evaluation. Digital tools enable MNCs to collect more data from local customers, predict trends in local markets, and understand their preferences, leading to a better evaluation of foreign markets. The collected data are then easily available to the HQ due to connectivity between locations. In this regard, data sharing platforms facilitate the coordination between markets and HQ, by which the HQ gain access to local data. Moreover, these platforms foster collaborations and data sharing among suppliers and the MNC, increasing transparency in GVCs and global decision-making processes.

Finally, central IT systems and digital platforms, which enhance global coordination and collaboration among stakeholders, enhance the involvement of foreign subsidiaries in IT development through their direct feedback. As stated before, direct feedback of foreign subsidiaries is crucial for digital solutions, since local needs and preferences have to be considered in such digital development. Digital platforms as powerful coordination tools facilitate the interconnection between subsidiaries and the development team.

Contrary to the above-mentioned relations between codes, the two research categories of “location of activities” and “internationalization-specific decision-making” seem to show no signs of interconnection. This makes sense, since the former is largely about location choices and talent acquisition, while the latter mostly comprises foreign market evaluation and adaptation. These aspects are less likely to be related to each other in regard to the impact of using digital technologies. Thus, the two research categories are less relevant to each other.

In conclusion, the model of digital impact provides a comprehensive view about how digitalization influences international companies’ operations and what triggers this influence. Since the four research categories encompass a variety of cross-border activities in international companies, the model has the potential to help understand the impact of digital technologies within international companies and on their international business processes.

6.2 The Digital Integrity-Digital Diversity Paradox

The relations between codes illustrated a general picture of how the use of digital technologies affects companies’ international operations. The consideration of these relations alongside the goals and barriers of digitalization in international companies, demonstrated in the previous

chapter, reveals an even broader perspective, hinting at a general tension affecting almost all types of digitalized international activities.

As indicated by interviewees and demonstrated at the beginning of the previous chapter, the use of digital technologies is mainly aimed at increasing efficiency of operations rather than generating revenues. In international companies, this efficiency refers to streamlining cross-border activities, which is achievable through digitalizing processes and automating tasks, resulting in the standardization of business processes. Once business processes become standardized, they can easily be applied and transferred across borders. By doing this, international activities can be integrated and orchestrated within MNCs' global network, creating digital integrity across global operations. On the other hand, however, this global integration becomes unattainable when MNCs choose to have varying IT solutions in different markets, leading to digital diversity in global operations, which hinders the efficiency aimed at the beginning. As a consequence, the two directions create a tension in regard to the use of digital technologies in international companies, as illustrated in figure 5. This tension applies to individual tasks, business processes, and digital resources such as data. The most important factors determining which approach should be or can be taken for individual processes are local and regional legislations (including politics and business environments) and the industry, in which the MNC is operating. As a result, the two directions are not only contradictory, but also interdependent across environmental elements, affecting digitalization efforts of international companies.

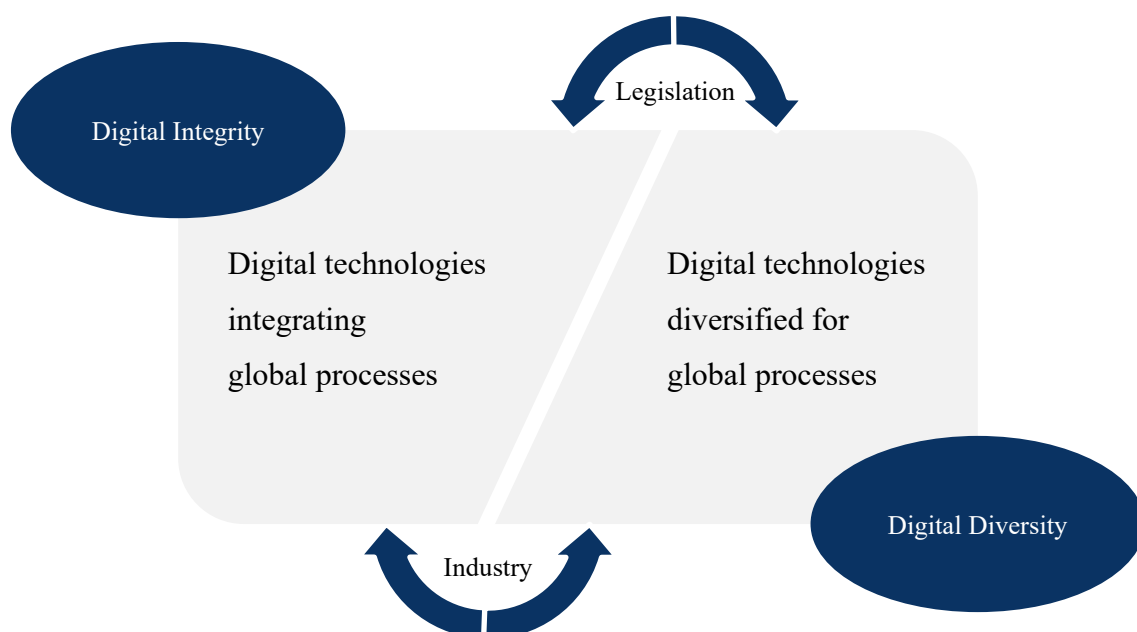


Figure 5: The Digital Integration-Digital Diversity Paradox

The first environmental element, named legislation, encompasses digitalization-related regulations in different countries and regions, geopolitical issues between the regions, as well as the influence of governmental institutes on the use of digital technologies. Examples for such digitalization-related regulations and issues include data protection laws like GDPR in Europe, technological-political tensions between the USA and China, and unique approaches of China about how digital technologies can be applied in the country. These factors encourage (or force) international companies to change their digitalized business processes accordingly.

Furthermore, industries also play a role in the decision between the two directions. In this regard, companies in specific industries are more prone to apply integrated solutions across their global operations than others. To illustrate, MNCs in the automotive industry are increasingly benefiting from digital integration of processes in production and logistics. The reason may lie in the fact that automobiles are mostly built the same for international markets (with some markets as exceptions) and the industry is less subject to local requirements. In contrast, integrating global processes in the insurance industry is difficult, since MNCs are typically operating through national companies in this industry, which likely leads international insurers to diversify their digital solutions, especially that local regulations also play a crucial role in the insurance industry. As another example, many processes can be digitalized and standardized in the retail and e-commerce industry, where the same digital platform can be applied across markets, with minor local adaptation such as the language of the website. These examples suggest that the choice between digital integrity and digital diversity is dependent on the industry and the business model of the international company.

As an illustration for the above-mentioned aspects, the finance departments in each foreign market had to send their financial reports to the HQ via email and using excel files in the past. This would delay the financial reporting of the MNC, since the company had to wait until all local reports were arrived and their validation was confirmed. However, the process is now automated, whereby local financial reports are collected automatically via data sharing platforms. Digital technologies allow for automatically creating, collecting, and analyzing the global financial data. Such an automation standardizes the process and increases the efficiency of cross-border activities. Such an approach integrates dispersed solutions developed in different locations, creating digital integrity across global operations. Nevertheless, local and regional regulations can disrupt such an integrated solution. For instance, China does not allow MNCs to transfer the collected data of local operations to Europe or the USA, making the financial reporting of Western companies challenging, since the companies need the data of all

global operations for such reporting. This forces MNCs to diversify their digital solutions for China and other countries with similar regulations, by which the local data is stored and processed locally. In industries in which national companies are legally independent, such as the insurance industry, such restrictions may have less influence on the finance department, highlighting the role of industries in this regard.

Such an influence is not limited to finance, but it encompasses all areas of businesses, from digital products to digitalized GVC activities. Indeed, the digital integrity-digital diversity paradox can be considered as a general theory, which is applicable to each of the four research categories introduced in this research project due to the fact that it is extracted from the text material and is expanded based on the aspects discussed under the categories. Thus, its use for the research categories is as follows.

For location of activities, the integrity enables international companies to locate their functional areas, GVC activities, and their digital talents flexibly, since integrated solutions allow for a high level of connectivity, collaborations, and non-location-bound working of employees. Nevertheless, legislations around the world necessitate diversification of IT footprints because international companies need to have, for example, several data centers in different regions and countries due to local requirements. Moreover, the role of industries can be seen in the automotive and rail industries. In the former, MNCs have diversified their IT departments and many of them have IT departments in various locations around the world, whereas in the latter, MNCs rely on one IT department in the home market.

For internationalization-specific decision-making, the most important aspects discussed in the previous chapter were market presence and market adaptation. In this regard, an integrated approach enables companies to have standardized digital products and solutions across global markets, which reduce costs and increase efficiency. However, geopolitics and regulations are critical barriers of such an approach, forcing international companies to adapt their digital solutions to local requirements. For instance, different data protection laws in the USA, Europe, and China hinder the development of one digital product suitable for all markets, leading to a diversity of digital solutions. Nevertheless, digital platforms like Netflix seem to be less affected by these restrictions compared to, for example, automobile manufacturers with an expansive footprint in foreign markets. While a company like Netflix can have one platform offered in international markets (except for China), automobile manufacturers have to diversify their digital solutions because different digital suppliers (such as cloud providers) are needed

in different regions. This does not seem to be the case for content providers in Netflix, where the same content is globally accessible.

For foreign subsidiaries and their roles, the digital integrity enhances their role in IT development. To illustrate, it was previously noted that digital solutions are in some cases developed in a specific subsidiary and are spread over in the MNCs' global network. Such an involvement of subsidiaries could not be viable without standardization of processes and its associated global integration. On the other hand, digital diversity helps subsidiaries fulfill their specific local needs in terms of digital solutions. In this regard, legislations play a crucial role by forcing international companies to, for example, establish joint ventures in China in order to access specific technologies such as AI algorithms, highlighting the importance of geopolitics and regulations when it is about the involvement of foreign subsidiaries in IT development. Moreover, industries seem to also play a role. In industries, where local preferences are more crucial such as the insurance industry, digitalization-related needs of local subsidiaries become critical. As a result, foreign subsidiaries are probably more involved in IT development in such industries because their feedback is necessary to adapt digital solutions. Conversely, companies in the media streaming industry such as Spotify typically produce global products without the need for local adaptation, and hence foreign subsidiaries' preferences are less relevant in this industry, highlighting the tendency towards digital integrity in such industries.

For governance and coordination, digital integrity is very important. From coordination of sub-units and global data platforms to knowledge transfer as well as technocratic and person-oriented coordination instruments, integrated solutions help reduce coordination costs and increase efficiency by standardizing business processes. Various examples were mentioned in the previous chapter; nevertheless, central IT systems such as ERP can be highlighted again, which enable MNCs to orchestrate data and operation flows in GVCs through one integrated digital solution. However, many MNCs have not yet succeeded to establish one ERP system in their respective GVC and operate through multiple systems for their global processes, leading to digital diversity when regarding to such digital solutions. In this regard, legislations are one reason for having multiple systems. For instance, China, India, and several other important markets demand operating companies in these countries to establish local data centers and not transfer data across its national borders. This means that MNCs have to diversify ERP systems according to the countries' requirements. In addition, it seems that production and logistics are less prone to be directly affected by local digitalization-related regulatory frameworks, indicating that integrated approaches for coordination of activities are likely to be applied in industries

typically associated with manufacturing such as the electronics industry compared to online businesses.

In conclusion, the digital integrity-digital diversity paradox adds a new perspective to the use of digital technologies in international companies and digitalization's impact on cross-border activities. The global integration of digital solutions is crucial for international companies, since they pursue higher levels of efficiency in their operations, as the main goal of digitalization. Nevertheless, such an integration is not achievable in regard to all types of business processes or products, leading international companies to decide which digital processes and products need to be diversified and which ones can be applied across borders with the same format. As highlighted by the interviewees, technology is not the limitation of global integration, but geopolitics and regulations are the main obstacles. This means that the choice between digital integrity and digital diversity is heavily influenced by governments and their policies. Moreover, industries significantly vary in regard to the types of products and business processes as well as how digitalized they are, affecting the decision on the above-mentioned two approaches.

It is important at this point to clarify how the digital integrity-digital diversity paradox differs from or relates to the traditional global integration-local responsiveness framework. The above-mentioned implications and arguments suggest that digitalization can positively affect the balance between global integration and local responsiveness. Other than the ability of digital technologies to standardize products, which enhances global integration, international companies can respond to individual markets' needs through innovative solutions by employing digital technologies while simultaneously benefiting from the economies of scale provided by such technologies. For instance, 3D printing allows a high level of product customization tailored to local preferences while mass production and cost reduction can also be achieved at the same time through implementing this technology. This means that digital integrity can enhance both global integration and local responsiveness of international companies. Moreover, new digitalized coordination and governance systems also enable such an enhancement of both integration and responsiveness. More specifically, digital platforms provide international companies with the ability to centralize governance while cooperate with local partners to adapt their internal processes locally. This means that digital integrity not only affects the integration-responsiveness balance for products, but it also changes the balance in regard to business processes.

However, such a positive effect of digital integrity is moderated by digitalization-related regulations such as local data protection policies and also industry characteristics as described in this section, leading to digital diversity. As a consequence, it can be argued that the use of

digital technologies causes a shift from traditional global integration-local responsiveness pressures to new specific-to-digitalization environmental factors, when it is about digitalized business processes. This is important because, as indicated by the interviewees and discussed in previous sections, there is no limitation in regard to which activities digital technologies can digitalize or harmonize, meaning that the technology is available and has the ability to significantly affect the integration-responsiveness balance. Nevertheless, different sets of pressures compared to the traditional ones hinder this ability.

To summarize, digital integrity can be considered as a new source, which can foster both global integration and local responsiveness through innovation and streamlined processes. On the other hand, digital diversity can be seen as a unique element, resulted from new digital-based pressures.

7 Conclusion

As stated at the beginning of the dissertation, this research project was aimed at exploring the impact of digital technologies on international companies, their cross-border activities, and internationalization processes. To this end, an array of relevant aspects and factors were introduced and their role in the digitalization of international companies was described. This chapter summarizes these aspects and provides possible implications for managers and the literature.

7.1 Summary of Findings

With the increasing significance of digitalization in today's business landscape, more and more scholars are putting their focus on the peculiarities of this trend and the outcome that the use of digital technologies can bring for businesses. This can especially be seen by recognizing the number of new studies in regard to digitalization in the management scientific journals. Particularly, the advent of new advanced technologies such as AI or blockchain and their implementation in companies' business processes in recent years have caused a more pronounced tendency to conduct research in this field. In this regard, international business literature has also received attention. Due to the increased international trade among countries and its resulted internationalization of companies, the impact of digitalization is not limited to within-country interactions, but it comprises international activities of companies as well, highlighting the importance of enhancing our understanding of how the use of digital technologies influences such cross-border activities in international companies.

To this end, this research project has attempted to focus on the above-mentioned research area, provide explanation to specific debates in the international business literature, and fill the research gaps. In doing so, the project was intended to explore how the use of digital technologies in international companies affects their business processes across borders. For this purpose, four research questions were developed to investigate the digital impact on GVCs, internationalization strategies, foreign subsidiaries, and the management of global interdependencies. These business fields comprise an important group of international activities, capable of providing a comprehensive view of the relationship between digitalization and internationalization-specific issues in companies. The findings have suggested that digital technologies have significantly changed companies' international interactions in respect to each of the above-mentioned research questions. Since the four research questions were already answered explicitly in section 5.2, this section summarizes the findings by listing the most striking and important results extracted from the qualitative data as follows:

- The configuration of GVCs is influenced by digitalization in the way that digital technologies create a worldwide connected network, providing a certain level of flexibility to locate assets and employees, which makes a great portion of activities non-location-bound.
- New unexpected locations such as Portugal and Hungary have emerged as technology hotspots, indicating that IT advancement may not be the only criterion of their selection, but rather a balance between talent availability, culture, and most importantly labor cost.
- Market presence in China has become a critical issue due to not only the market's unique IT-related regulations, but also its IT advancements which have enabled local competitors to emerge and have led Western MNCs to follow the strategy of “from China to the world”.
- Despite the ability of digital technologies to standardize products and processes, political and regulatory frameworks dictate the local adaptation of digital solutions according to markets' needs, introducing these frameworks as the main obstacles of global approaches.
- Foreign subsidiaries' role in IT development is multifaceted, including initiating specific pilot projects, initial contact for acquisition of and partnership with local startups, providing feedback about local digital needs as the entity familiar with the market, and integrating local complementary resources.
- Central IT systems have become the cornerstone of interaction management by connecting global subunits, assets, and employees into one platform, enabling the central governance of a global factory, the management of global data, and the coordination of operations.
- Person-oriented coordination instruments have lost their importance in routine operations due to automation, while the number of international travels and visits is reduced as a result of using digital technologies, which also enhance cross-border knowledge transfer.
- Partnerships have become an essential part of today's international business. However, their challenges are underestimated, including disruptions in the harmonization of global processes, reliance on technology providers from specific countries, and IT security risks.
- Remarkably, digitalization-related geopolitics and regulations have emerged as one of the most influential factors in global IT development, necessitating the diversification of locations, infrastructures, and partners, as well as complicating global coordination of activities.

- The advantages of digital platforms are found to be not limited to customer-to-business applications, since internal platforms surprisingly affect international activities in various ways, from creating a global network and managing intra-company and inter-company interdependencies to involving foreign subsidiaries in IT development.

In addition to the above-mentioned key findings, this research project has provided a model for demonstrating the impact of digital technologies on international activities. The model is a framework to enhance the understanding of the digitalization-internationalization relationship and shows how international companies are affected by the use of digital technologies. More importantly, the model not only provides answers to the four research questions posed at the beginning of the study, but it also presents a more general picture in international companies, indicating how the impact of digitalization is associated with local and global activities and what the drivers of such an impact are. As a result, the model should be capable of representing the digitalization impact occurring in international companies in the real world.

Ultimately, a new paradox was introduced to draw a line between the two possible directions for international companies to follow in regard to their IT development. The paradox considers digital integrity and digital diversity as the two choices of IT implementation in international companies, and highlights legislations and industries as the factors affecting this choice. Moreover, the paradox is intended to be useful in providing explanation for international companies' strategies and decisions on following global or local approaches in regard to digitalizing their cross-border business processes. As a result, the paradox can potentially be considered as a general theory encompassing all types of international activities.

In conclusion, this research project has attempted to provide relevant results and answer the four research questions proposed at the beginning by demonstrating how and to which extent the use of digital technologies influences companies' international business activities. The findings suggest that this use of innovative solutions is associated with an increase in flexibility, efficiency, and diversity of digitalized international business activities, potentially supporting international companies' success in foreign markets.

7.2 Contribution to Theory

In this research project, the impact of digitalization on international activities has been explored and demonstrated under distinct research fields. Accordingly, the research project contributes to the international business literature in several ways.

First, this study provides new insights about global technology hotspots. The importance of such hotspots is less discussed in the international business literature. In this regard, this study identifies recently established technology hubs such as Portugal and stresses the position of well-known hubs like Silicon Valley in MNCs' IT development. Moreover, the debate in the literature over international operations through lighter asset footprints has been addressed (Banalieva & Dhanaraj, 2019, p. 1376; Casella & Formenti, 2018, p. 101; Hennart, 2019, p. 1393; Verbeke & Hutzschenreuter, 2021, p. 610). The results contradict with most positive assumptions about the ability to reduce physical assets in foreign markets as a consequence of digitalization. It was noted that physical presence is still necessary even for digitalized businesses despite the flexibility that digital technologies can provide in this regard.

In line with this finding, this study also contributes to the literature that investigates reshoring as well as localized production. As highlighted by the literature, MNCs may decide to reshore due to automation and the use of robots in production (Ancarani et al., 2019, p. 367; Strange & Zucchella, 2017, p. 178), while technologies such as 3D printing may lead to localized production of specific products and components (Hannibal & Knight, 2018, p. 1125; Strange & Zucchella, 2017, p. 178). This study goes beyond these arguments and shows that the above-mentioned technologies are not very influential in MNCs' decision on location choices. The reason may lie in the fact that these technologies are not advanced enough yet to change traditional production systems significantly.

Second, this study sheds light on a domain of research that is focused on digital internationalization of companies (e.g., Chen et al., 2019; Katsikeas et al., 2020; Lee et al., 2019; Parente et al., 2018). In this respect, the importance of digital infrastructure in companies' online international expansion alongside the significance of the increased competition in local markets were highlighted. Moreover, this study extends the literature on local adaptation of products and processes. Theorizing on the need for local responsiveness, it was indicated that digital solutions need to be adapted locally. The study goes beyond traditional reasons for such an adaptation and highlights the role of digitalization-related regulations and politics as the most prominent barriers of following global approaches.

Third, this research project contributes to the literature on dual embeddedness of foreign subsidiaries and argues that both HQ-subsidiary and subsidiary-market relationships are enhanced by digitalization. Research previously assumed that high-innovative subsidiaries can influence digitalization efforts of MNCs (Ekman et al., 2020, p. 587). This study not only confirms such a relationship, but it goes beyond that and shows how the technological advancement of specific

subsidiaries, particularly in China, can change the IT development of the whole company. In addition, the importance of subsidiaries' direct feedback about digital solutions was underlined. Regarding the external embeddedness, subsidiaries are playing a more important role in the digital era because they are considered as the contact point to local suppliers and the entity familiar with the local market. Since partnerships with local companies and acquiring local complementary resources are crucial in the contemporary business landscape, foreign subsidiaries' expertise becomes necessary to integrate such resources and knowledge into the MNC's global network.

Fourth, this study responds to research opportunities that has been subject to calls for more investigations, namely the governance of global factory (Buckley & Strange, 2015, p. 246). The findings suggest that digital technologies have enabled MNCs to manage their global network of manufacturing sites remotely, eliminating or at least reducing the responsibility of local representatives or subsidiaries for controlling production plants. Moreover, this study extends the literature that has investigated various technocratic and person-oriented coordination instruments (e.g., Holtbrügge, 2005). Theorizing on previous research and digitalization capabilities, it was implied that technocratic coordination plays a more pronounced role in daily operational tasks, while person-oriented instruments have become more efficient due to smart solutions such as online meetings and collaborative platforms. In addition, this study contributes to the literature on cross-border knowledge transfer (e.g., Biggiero, 2006; Bucher et al., 2024) by specifying that digital solutions such as augmented and virtual reality glasses, gamification, and webinars facilitate the cross-border transfer of knowledge, including tacit knowledge, without the need for relocating people.

Fifth, this research project extends the growing body of research in the international business literature that investigates digital ecosystems and platforms (e.g., Banalieva & Dhanaraj, 2019; Li et al., 2019; Nambisan & Luo, 2021; Nambisan et al., 2019; Pitelis & Teece, 2018; Stallkamp & Schotter, 2021; Verbeke & Hutzschenreuter, 2021; Zeng, 2022). More specifically, research has mostly focused on business-to-customer digital platforms. This study goes beyond that by addressing business-to-business and also internal digital platforms of MNCs. Such platforms are a great tool to connect global stakeholders in various industries as well as in GVCs, facilitating governance and coordination of global interdependencies, cross-border knowledge transfer, and the involvement of foreign subsidiaries. More interestingly, internal platforms can increase the power of HQ, since the HQ become the hub of the platform, controlling international business processes.

And finally, this study hopes to extend the international business literature in general by introducing and discussing a new model as well as a new paradox, aiming to provide a framework for understanding how digitalization has affected international companies' operations across borders. Overall, many new aspects have been elaborated in this research project, such as new technology hotspots or the involvement of foreign subsidiaries in IT development, implying that there are still research opportunities in this field despite the increased attention from scholars in recent years.

7.3 Implications for Managers

The findings of this research project also have implications for managers and practitioners intending to exploit the use of digital technologies in regard to cross-border activities. These implications comprise both the strategic and operational levels, providing insights about the implementation of digital solutions in international companies.

At the strategic level, managers need to pay attention that following a fully global integrated approach with IT development is not feasible in reality despite the capability of digital solutions to actualize such an approach and the willing of top managers to serve international markets with similar digital solutions. As the results indicate, digital technologies are able to standardize products and business processes, making the global employment of smart solutions easier. Nevertheless, digitalization-related regulations such as data protection laws in different regions significantly affect international companies' digital strategies and require local adaptation of IT development. As a result, managers have to find a balance between the global integrity and the localization of their digitalization efforts.

Furthermore, the importance of technology hotspots has been discussed in this study. International companies should make the strategic decision to invest in particular IT hubs around the world. In this regard, managers have to consider various criteria to choose the suitable technology hotspots for their companies. These criteria can include the types of digital expertise that they need, the proximity to their GVCs and operations, and corporate cultures. More importantly, the results suggest that labor cost is an important factor for IT development, which is typically high in well-known hubs such as Silicon Valley and is increasing in other areas such as Pune in India or Lisbon in Portugal. Accordingly, managers should take a look at wages at different technology hotspots to find a balance between acquiring high-skilled digital talents and IT development costs.

In addition, the involvement of foreign subsidiaries in IT development, their role as contact points to local technology suppliers, and the importance of subsidiary-specific advantages in countries such as China, suggest that MNCs should pay attention to different capabilities of their global subsidiaries, some of which can enhance digitalization efforts due to local talent pools and expertise in specific technologies. For instance, AI algorithms tend to be more advanced in the USA and China, prompting MNCs to rely more on their subsidiaries' involvement in these markets.

At the operational level, this study draws attention to how digital technologies enhance the efficiency of cross-border interactions. Especially, internal digital platforms are able to not only connect global stakeholders, but also facilitate data sharing and knowledge transfer. This means that managers should rely more on such platforms to manage interdependencies within the MNCs' global network. Despite the advantages, not all MNCs have succeeded to implement such platforms for their international operations, usually referring to smaller MNCs as was the case among the studied companies. This suggests that managers of such companies must invest more in platform-based solutions to benefit from connectivity, network governance, and coordination provided by such solutions. This is crucial because the advantages of digital platforms are not limited to within-company interdependencies, but include industry-wide applications as described before.

Moreover, the results have suggested that advanced technologies such as augmented and virtual reality enable companies to not only facilitate cross-border transfer of tacit knowledge, but also enhance the efficiency of person-oriented coordination instruments, meaning that managers can avoid many unnecessary travels and visits to other locations by integrating more and more of such solutions in international operations. As a result, managers should consider these solutions and encourage global teams and employees to benefit from innovative approaches. This is critical because cultural resistance to digitalization of processes may lead to the avoidance of such solutions, highlighting the role of managers to increase the awareness of employees about organizational advantages of digital solutions.

In conclusion, this research project provides insights for managers about the impact of digital technologies on companies' international operations. The reason lies in the fact that the project encompasses a set of different activities within international companies, attempting to comprise various types of impact that digitalization might have on such companies and their global interactions.

7.4 Limitations and Future Research Gaps

As a final point, a number of potential limitations need to be considered, alongside opportunities for future research. Given that this research project has been conducted using qualitative methods, general criticisms often attributed to such types of research apply here as well.

To begin with, there is the limited generalizability of the results. In this regard, the number of the interviewed companies can prevent the building of a more general correlation between digital technologies and international activities, even though the selected sample was adequate for the descriptive purpose of this research project and provided insights into the digitalization impact on international companies. Future research can enhance our understanding of this relationship by using quantitative methods to examine whether the findings are applicable in a larger case.

Furthermore, this study collected data from publicly listed companies in a single home country (Germany) to ensure consistent data availability. This restriction ignores possible cultural or specific market-based factors that could influence how companies are using digital technologies and hence the impact of such technologies on their international activities. Future research should also examine companies from other countries to assess the generalizability of findings.

In addition, the sample comprised companies from various industries. As the importance of industries was highlighted in this study, it can be considered as a limitation that only four companies were operating in the same sector (automotive), with others being active in quite different industries. This may influence the generalizability of findings, since the specifics of the digital impact may vary in, for example, the food industry compared to the automotive. Thus, such a limitation can be addressed in future works by including more companies from similar industries.

Despite the above-mentioned limitations associated with qualitative research, this method proved to be effective for this research project. It enabled the empirical identification and discussion of how digital technologies affect cross-border activities of international companies by recognizing patterns and themes in the collected data that were previously present in the literature only to a smaller extent.

Consequently, this research project has provided some specific insights and a comprehensive view over the relationship between digitalization and internationalization-specific issues. These

included various aspects, from location of activities to coordination of cross-border interdependencies. In this regard, future (quantitative) studies are recommended to concentrate on particular aspects introduced in this study. For instance, scholars could investigate how investing in specific technology hotspots and technologies developed in them can increase the international performance or the agility of MNCs in global markets.

Moreover, this study included various digital technologies, such as AI, augmented and virtual reality, ERP systems, etc. while investigating their impact on companies' international activities. Future works are encouraged to examine the impact of individual technologies. Especially, AI is a promising technology that can affect international activities by, for example, forecasting patterns in global logistics, predicting future trends and customers' preferences in local markets, or automating tasks in global production. These implications can be of great interests for international business literature.

Finally, this research project highlighted the role of several aspects, whose impact on international activities was previously paid less attention in the literature. These include digitalization-related geopolitics and regulations alongside internal digital platforms. Thus, it is recommended that future research should be undertaken to investigate the extent and scope of these two factors in regard to digitalization efforts of international companies.

To make the final statement, this study wanted to contribute to the international business literature and hopes, despite its limitations, to serve as a base for future studies, enhancing the understanding of the research field about the relation between digitalization and international business.

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Erklärung zum selbständigen Verfassen der Arbeit

Ich erkläre hiermit, dass ich meine Doktorarbeit „The Impact of Digital Technologies on Companies’ International Business Activities“ selbstständig und ohne fremde Hilfe angefertigt habe und dass ich alle von anderen Autoren wörtlich übernommenen Stellen, wie auch die sich an die Gedanken anderer Autoren eng anlehnenden Ausführungen meiner Arbeit, besonders gekennzeichnet und die Quellen nach den mir angegebenen Richtlinien zitiert habe.

Ort, Datum

Unterschrift