

**Internationalization in the Digital Age: Exploring the Link Between
Digitalization and International Business Strategy**

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Abstract

Internationalization and digitalization are increasingly impacting organizational outcomes. However, little is known about their interaction. This doctoral dissertation examines the role of digitalization in international business by providing a new perspective on internationalization in the digital age. Its four cumulative studies explore (1) the current state of the field of international business in regard to digitalization, (2) the impact of ICT on the degree of internationalization, (3) the impact of ICT on international behavior in terms of FDI speed, scope, and location dispersion, and (4) the effect of ICT on FDI greenfield location choice. The results show that digitalization affects international business on three levels: the degree of internationalization (the top layer), the internationalization behavior exhibited in the internationalization process (the second layer), and specific, city-level location choice (the third layer).

This dissertation draws on a rare data set by combining ICT data from European firms with city-level FDI greenfield data. It studied firms headquartered in Switzerland, Germany, the Netherlands, and the United Kingdom over a period of five years. This dissertation provides four major findings, which are discussed in detail in the four studies.

First, international business research needs to better understand and further investigate the impact of digitalization both on firm internationalization and on IB research itself. Second, firms can leverage ICT to enhance their international position in terms of sales. Third, while firms might not change the scope of FDI, ICT-intense firms follow different FDI strategies than their counterparts in terms of FDI speed, scope, and location choice. Fourth, ICT intensity impacts location choice within a host country. Existing clusters become less attractive while firms may benefit from a greater degree of freedom in their location choice. Each of the four empirical papers gathered here pays special attention to established transaction cost drivers, such as cultural distance or industry dynamism. Under such conditions, as well as for market- and knowledge-seeking activities, ICT has a bidirectional effect. The implications for theory and practice are discussed in detail in the following dissertation.

Overall, the key message of this dissertation is that digitalization has the potential to fundamentally change international business theories. Therefore, international business scholars should focus more on integrating findings from other fields, such as MIS research, to advance our knowledge. This dissertation contributes to the emerging discussion on internationalization in the digital age and shows that firms can leverage digitalization in their international business strategy.

Zusammenfassung

Internationalisierung und Digitalisierung wirken sich zunehmend auf Unternehmen aus. Über die Wechselwirkung von Internationalisierung und Digitalisierung ist jedoch nur wenig bekannt. Diese Dissertation untersucht die Rolle der Digitalisierung im Bereich International Business. Dies wird in vier kumulativen Studien untersucht: (1) aktueller Stand in der internationalen Business Literatur im Hinblick auf die Digitalisierung, (2) Einfluss von ICT auf den Internationalisierungsgrad von Unternehmen, (3) Einfluss der ICT auf das internationale Verhalten in Bezug auf Geschwindigkeit, Umfang und Standortdispersion von FDI und (4) Einfluss von ICT auf die Standortwahl von FDI.

Die Ergebnisse zeigen, dass sich Digitalisierung auf drei Ebenen des International Business auswirkt: auf den Grad der Internationalisierung (1. Ebene), auf das Internationalisierungsverhalten im Internationalisierungsprozess (2. Ebene) und auf die spezifische Standortwahl auf Stadtebene (3. Ebene). Untersucht wurden Unternehmen mit Hauptsitz in der Schweiz, Deutschland, den Niederlanden und dem Vereinigten Königreich über einen Zeitraum von fünf Jahren.

Die Dissertation resultiert in vier Hauptergebnisse. Erstens: IB Wissenschaftler sollten die Auswirkungen der Digitalisierung auf die Internationalisierung der Unternehmen verstärkt untersuchen. Zweitens: Unternehmen können die ICT nutzen, um ihre internationale Position bezüglich Umsatz verbessern. Drittens: Auch wenn Unternehmen den Umfang der ausländischen Direktinvestitionen nicht verändern, verfolgen ICT-intensive Firmen in Bezug auf Geschwindigkeit, Umfang und Standortwahl andere FDI-Strategien als ihre Konkurrenten. Viertens beeinflusst die ICT-Intensität die Standortwahl innerhalb eines Landes. Bestehende Cluster verlieren an Attraktivität, während die Unternehmen von einem größeren Grad an Freiheit bei der Standortwahl profitieren können. Jede der vier präsentierten empirischen Arbeiten berücksichtigt etablierte Transaktionskostentreiber, wie der kulturellen Distanz oder der Industriedynamik. Unter solchen Bedingungen sowie für Markt- und Knowledgeaktivitäten hat ICT einen bidirektionalen Effekt. Die Auswirkungen für Theorie und Praxis werden in dieser Dissertation im Detail diskutiert.

Die Kernaussage dieser Dissertation ist, dass die Digitalisierung das Potenzial hat, internationale Wirtschaftstheorien grundlegend zu verändern. Die vorliegende Dissertation leistet einen Beitrag zu der sich abzeichnenden Diskussion über Internationalisierung im digitalen Zeitalter und zeigt, dass Unternehmen die Digitalisierung in ihren internationalen Geschäftsstrategie nutzen können.

“The Internet is the most effective instrument we have for globalization”

— Milton Friedman

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Alphabetical list of acronyms and abbreviations

CEO	Chief Executive Officer
DOI	Degree of Internationalization
ERP	Enterprise resource planning
et al.	et alii (and others)
EU	European Union
EUR	Euro (currency)
FDI	Foreign direct Investment
fsts	Foreign Sales to Total Sales
GLS	Generalized Least Squares
HQ	Headquarters
IB	International Business
ICT	Information and Communication Technologies (Digitalization)
ISDN	Integrated Services Digital Networks
IT	Information Technology
log	logarithm
M&A	Mergers and Acquisitions
MIS	Management Information Systems
MNE	Multinational Enterprises
OLS	Ordinary Least Squares
PhD	Doctor of Philosophy
Python	Programming language
R&D	Research and Development
ROA	Retrun on Assets
SME	Small and medium-sized enterprises
TMT	Top Management Team
VIF	Variance Inflation Factor

Part I

Introduction

1 Relevance of this dissertation

Internationalization and digitalization are key features of firms' strategic positioning (Drnevich and Croson, 2013; Alcácer, Cantwell, and Piscitello, 2016). Over the last 30 years, innovations in information and communication technologies (ICT) have reshaped the global landscape in which firms operate. On the one hand, such ICT-based innovations have enabled new players such as Amazon, Facebook, or Google to swiftly conquer international markets. On the other, digitalization has been challenging (and continues to challenge) established firms to keep pace with new competitors and to leverage digitalization to improve their own position internationally.

Despite commercial interest, public awareness, and over three decades of international business research, scholars in the field of international business only just beginning to explore the impact of digitalization. International business research has long highlighted how transaction costs arise and impact the internationalization behavior of firms (e.g., Upsalla Model, cultural differences, or OLI Framework). However, they have neglected the key role of digitalization (Alcácer et al., 2016; Banalieva and Dhanaraj, 2019). Recent studies have argued that digitalization fundamentally alters information costs and cross-border transfer of firm-specific advantages (FSA) (Banalieva and Dhanaraj, 2019). Rooted in the framework of markets and hierarchies (Hymer, 1960; Williamson, 1975), FSA are crucial to internationalizing business activities. Internalization theory offers a theoretical lens to explain why MNEs exist, and why organizations expand beyond national borders. It suggests that firms exploit their FSAs across borders to capture or generate value from imperfect markets (Buckley, 1988; Buckley and Casson, 2009). This dissertation follows the perspective of internationalization theory, which holds that “an MNE is created when a firm can increase its value by internalizing markets for certain of its intangible assets across national borders” (Kirca, Hult, Roth, Cavusgil, Perry, Akdeniz, Deligonul, Mena, Pollitte, Hoppner, Miller, and White, 2011, p.48).

Understanding the impact of cross-border transfer of information and goods is of key practical and theoretical relevance. In particular, MNEs must be aware of the benefits and risks of internationalization in the digital age. This understanding supports firms in enhancing their standing in a digital environment. Such advantages help firms to respond to new market entries and global competition. At the same time, policy makers need to better understand the interplay of internationalization and digitalization to encourage firms to engage in both domains in order to ensure economic growth.

This dissertation aims to overcome this limitation in international business research and thereby to advance our knowledge about internationalization in the digital age. In doing so, it first identifies the research gaps existing in international business on multiple levels. On the first level, it focuses on the surface, i.e., the impact of ICT on the degree of internationalization. On the second level, it zooms-in on firms' internationalization behavior in terms of speed, scope, and the location dispersion of FDI activities. On the third level, it studies city-level FDI location choices.

2 Aim and research questions

This doctoral dissertation aims to contribute to international business research by enhancing our knowledge about how and under which conditions firms can leverage digital capabilities in an international business environment. It offers an extensive review of the interface between international business and digitalization in the field of international business. This systematic review establishes a robust basis for the subsequent three empirical chapters of this dissertation. Since little is known about the interface between internationalization and digitalization, reviewing prior relevant research enables identifying key research gaps and contributing adequately to international business research. This dissertation consists of four cumulative papers, whose research questions are shown in Table 1.

Table 1: **Research Questions**

Research Question 1	What is the current state of the literature on the Internationalization-Digitalization interface? How should further research in this area move forward to advance the field of international business?
Research Question 2	How does ICT influence the degree of internationalization? And under which conditions can MNEs benefit from ICT usage?
Research Question 3	How does ICT impact MNEs' FDI behavior in terms of speed, scope, and location dispersion? And what is the impact of knowledge- and asset-seeking activities?
Research Question 4	To what extent and in what way does ICT intensity impact the likelihood of foreign direct investments being co-located? And what is the moderating role of cultural distance and business type activities?

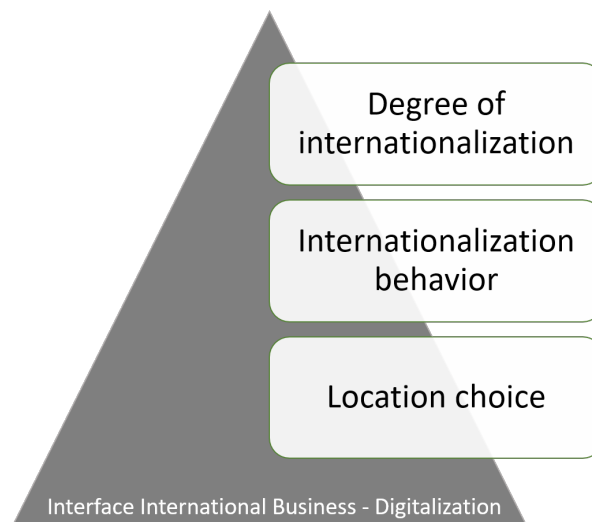
Focusing on these four research questions aims to highlight the impact of digitalization on multiple layers of international business research. It also aims to contribute to the MIS literature by revealing the disconnect and overlap in theory between MIS research and international business research, two related yet still separated fields.¹

¹For a detailed discussion, see Drnevlch and Croson 2013

3 Research scope

This dissertation builds on three established research streams (and helps advance these fields by focusing on the impact on digitalization): (1) Degree of internationalization, (2) internationalization behavior, and (3) location choice. The research presented here focuses on these three research streams in order to make a comprehensive contribution to international business research. To this end, it proceeds from the top layer down: It first demonstrates that digitalization affects the degree of internationalization (measured as foreign sales to total sales) before exploring internationalization behavior, including city-level location choices. Figure 1 illustrates the three levels.

Figure 1: **Research Scope**



First, theories in international business have focused on the degree of internationalization, explaining what drives internationalization and which factors hamper further internationalization. Some scholars have argued that firms exploit their FSAs across borders to generate value from imperfect markets (Kirca et al., 2011). In contrast, other scholars have maintained that transaction cost drivers (e.g., cultural distance, institutional distance, international business networks, or Top Management Team International Experience) impact the degree of internationalization (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017; Monaghan and Tippmann, 2018; Verbeke, Coeurderoy, and Matt, 2018). The general rationale has been that firms expand abroad until the associated costs of further internationalizing outperform the benefits (Buckley and Casson, 1976; Rugman and Verbeke, 2005; Kirca et al., 2011). The dominant theoretical perspective in this research stream is transaction cost theory (Kirca et al., 2011). Building on these insights, this dissertation explores how ICT impacts the degree of internationalization. It focuses in particular on established transaction cost drivers, such as the cultural distance between the home and host market. In this way, it bridges findings in international business and MIS research to explain the degree of internationalization.

Second, in the process of internationalization – which ultimately results in the degree of internationalization – firms face multiple critical decisions, such as international speed, scope, and location dispersion. The combination of these factors has been identified as a main source of competitive advantage in the process of internationalization. Extant research has focused on the impact of rapid

FDI expansion (Chang and Rhee, 2011), organizational learning and evolution (Vahlne and Johanson, 2017), or environmental uncertainty (Belderbos, Tong, and Wu, 2018). Based on a transaction cost perspective and MIS research, this dissertation takes an integrative perspective, providing theoretical contributions and empirical evidence that ICT impacts both transaction costs and the internationalization behavior of firms by focusing on foreign direct investments.

Third, location choice for foreign direct investments is a key topic in international business and concerns the most granular, within-country level. In this context, colocation has been a source of competitive advantage due to reduced transaction costs (Alcácer and Chung, 2014). Previous international business research has focused on the liability of foreignness (Hymer, 1960; Vahlne and Johanson, 2017), access to skilled labor, geographic location advantages (Alcácer and Chung, 2007; Mariotti, Mutinelli, Nicolini, and Piscitello, 2015), and the openness of the host location (Nachum, Zaheer, and Gross, 2008). Transaction cost theory is central to the liability of foreignness and one of the dominant theoretical perspectives in this research stream. Linking ICT intensity with colocation behavior on a global basis, this doctoral dissertation addresses a major research gap in international business. First, it sheds new light on the location choice of firms by going beyond the country level to focus on the city level. Second, the integration of ICT in this context enhances the field of international business and helps to understand the importance of the shift from physical places to information exchange in international business (Banalieva and Dhanaraj, 2019).

4 Theoretical perspectives

This dissertation adopts two main theoretical perspectives to explore the impact of digitalization on international business. The following overview of internationalization theory explains why firms expand beyond national borders and why MNEs exist. It also introduces transaction cost theory, which describes the associated costs of internationalization, which hamper further internationalization, speed, scope, or location choice.

First, internationalization theory explains why firms expand across national borders and why MNEs exist. Grounded in internalization theory and the framework of markets and hierarchies (Hymer, 1960; Williamson, 1975), internationalization theory provides a theoretical basis for explaining why organizations expand beyond national borders. Building on internalization theory, internationalization theory suggests that firms exploit their FSAs across national borders to capture or create value from imperfect markets and to internalize these (Buckley, 1988; Buckley and Casson, 2009). Kirca et al. (2011) stated that “an MNE is created when a firm can increase its value by internalizing markets for certain of its intangible assets across national borders” Kirca et al. (2011, p.48). In support of this theory, several studies have shown that superior information about foreign markets reduces associated challenges in the internationalization process (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017). Liability of foreignness, as well as cultural or institutional differences, have been identified as major challenges for MNEs. Other studies have argued for establishing a regionalization theory, which argues that most MNEs generate sales in their home region rather than globally. “The dominant theoretical explanation offered in this literature is that, by expanding mainly within their home region, firms can significantly reduce managerial and administrative costs related to cultural and geographic distance” (Ruigrok, Georgakakis, and Greve, 2013, p.7).

Second, in explaining the associated challenges in the internationalization process, transaction cost theory has become the dominant theoretical lens in international business research. Transaction costs result from asymmetrically and unequally distributed information among two or more parties (Cordelia, 2006). Kim, Hoskisson, and Lee (2015) further segmented such transaction costs into internal and external transaction costs. On the one hand, internal transaction cost address administrative and coordination challenges, which increase with geographical, cultural, or institutional distance. Previous research has focused on such transaction cost drivers from various perspectives on firm-level outcomes (e.g., firm performance or degree of internationalization). On the other hand, extant research has focused on external transaction costs, which arise in the internationalization process when dealing with external agents. Ruigrok, Amann, and Wagner (2007) argued that agency costs occur if international expansion increases. Under such conditions, transaction costs increase due to coordination and negotiation with external parties. This in turn may hamper firm internationalization, speed, scope, location dispersion, as well as location choice.

5 Empirical setting

This doctoral dissertation is based on a European dataset spanning the years 2011 to 2015. It focuses on listed firms headquartered in Switzerland, Germany, the Netherlands, and the United Kingdom. Three selection criteria were used to further limit the sample (to ensure comparability and to take into account that all firms are free to make independent strategic decisions). First, the aforementioned four countries were chosen because they headquarter major international and globally operating firms. Second, these countries were also selected because the necessary technical infrastructure may be assumed to exist for the majority of firms based in these countries. Selecting countries with insufficient infrastructure would have meant that firms might have been unable to use digital tools for their operations even if they were willing to do so. Thus, country selection was limited to countries assumed to be equally developed in technical terms. Third, the four selected countries all had leading stock exchanges in Europe at the time of investigation (Worldatlas, 2018).

ICT data were sourced from Aberdeen (former Harte Hanks). FDI data were gathered manually from the fdi Markets database. Firm-level figures came from Thomson Reuters Eikon and were cross-validated with Bloomberg Terminal data. The fdi markets database tracks cross-border greenfield investments globally (Castellani and Lavoratori, 2019). The data collection was conducted manually since the platform does not allow bulk downloads. Digitalization data were sourced from the Aberdeen Europe database, following Bloom, Garicano, Sadun, and Van Reenen 2014. The database contains more than 160,000 firms on the plant level across 20 European countries. While this database has frequently been used in MIS research (e.g. Ray, Xue, and Barney 2013; Bloom et al. 2014; Kim, Mithas, and Kimbrough 2017), it has not been leveraged in the field of international business despite providing rich company-level information on digitalization.

Due to missing data for ICT-related variables, three selection criteria were used. First, small and medium-sized companies (SMEs) were excluded due to missing data and insufficient FDI activity. SMEs were also excluded based on the European Union's definition of SMEs: "companies with less than 250 staff headcounts, annual revenues of less or equal to EUR 50 million, and total assets of less or equal to EUR 43 million" (EuropeanUnion, 2017). Second, firms serving as financial

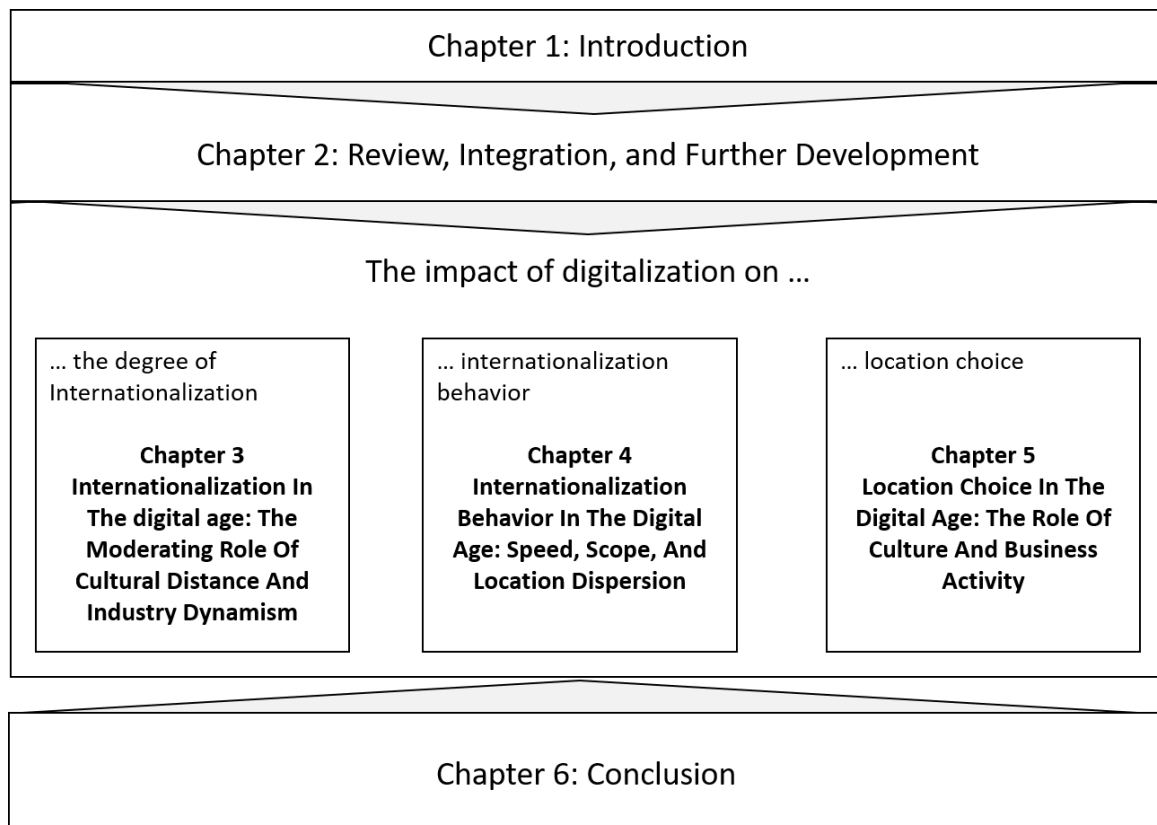
investment vehicles or pure holding entities were excluded. Selection was based on the primary SIC code of 67. Third, subsidiaries unable to make independent decisions were excluded. Fourth, firms with missing data were excluded. The sample size varies among the three empirical papers due to different research settings (i.e., degree of internationalization, internationalization behavior, location choice). The data set was generated and analyzed individually for every paper.

Data analysis was based on three different quantitative methods. First, generalized least squares (GLS) regression analysis was used to explore the impact of ICT on the degree of internationalization. This statistical technique enabled utilizing the pooled time series panel data set, controlling for unobserved heterogeneity, and considering the within and between unit effects in the analysis. Second, a simple ordinary least squares (OLS) regression analyses clustered by firm was applied to control for firm-specific effects. Third, logistic regression with clustered firm observations was used to control for firm specific effects, such as FDI frequency. All analyses used Python 3.6 for data management and data merging, and Stata 14 for all quantitative analyses.

6 Dissertation structure

This dissertation is divided into six chapters. Chapter 1 provides a general introduction to the four cumulative papers while chapter 6 offers a conclusion to the whole dissertation, (see Figure 2 for an overview). Chapter 2 establishes the basis for the subsequent three empirical papers. It reviews prior studies in the field of international business, highlights research gaps, and links these to the MIS and IS literature. Further, it synthesizes prior international business work and provides a framework for future research to contribute to the broader field of international business. Chapter 3 focuses on the degree of internationalization and the impact of cultural distance and industry dynamism. Chapter 4 assesses the impact of ICT on key internationalization behavior drivers – speed, scope, and location dispersion. Chapter 5 explores the impact of ICT on FDI greenfield investments and their location choice.

Figure 2: **Structure of the dissertation**



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Part II

Internationalization in the Digital Age: A Review, Synthesis, and Research Agenda

Abstract

Little is known about internationalization in the digital age. The field of international business lags behind other disciplines in this respect. We conducted a systematic review of the literature to explore the use of information and communication technologies (ICT). We revisited the internationalization literature by integrating MIS and information science research and reviewed 892 studies published between 1990 and 2020. Our findings shed new light on the frequently neglected interface between internationalization and digitalization. Besides describing the implications of our findings for theory and practice, we synthesize existing findings in international business and propose an agenda for further research.²

Keywords: International Business; ICT; Digitalization

²Authors: Camillo Werdich

1 Introduction

Recent trends in the field of international business are associated with digitalization and the flow of information (Alcácer, Cantwell, and Piscitello, 2016; Hazlehurst and Brouthers, 2018). Over the past three decades, innovations in information and communication technologies (ICT) have changed business processes and have helped firms such as Facebook and Tesla to rapidly internationalize (Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013; Brouthers, Geisser, and Rothlauf, 2016; Chen and Kamal, 2016; Ting and Gray, 2019). Overall, recent studies have suggested that digitalization alters some of the key assumptions of internationalization theory, such as firm-specific advantages or market entry choices (Alcácer et al., 2016; Banalieva and Dhanaraj, 2019).

Although international business research has existed for three decades, the field lags behind other disciplines in integrating ICT into its existing theories (Drnevich and Croson, 2013; Alcácer et al., 2016; Coviello, Kano, and Liesch, 2017). ICT has become increasingly important in other fields such as marketing (Caspin-Wagner, Massini, and Lewin, 2018), information system research (Mithas, Whitaker, and Tafti, 2017), and IT implementation and usage (Devaraj and Kohli, 2003). Furthermore ICT occupies a key role in production process (Laplume, 2018), in Global Value Chain (GVC) research (Gooris and Peeters, 2015), and in communication and firm organization (Bloom, Garicano, Sadun, and Van Reenen, 2014). While these studies are partly related to international business, empirical findings remain widely dispersed and need to be integrated into international business theories. Thus our central research question is, what is the current state of the literature on the Internationalization-Digitalization interface? How should further research in this area move forward to advance the field of international business? A systematic review and synthesis of prior studies, at the interface between internationalization and digitalization, helps to establish a platform for further research, and contributes to the broader international business strategy literature (Paul and Criado, 2020).

We review which areas in international business research require further research to advance the field. More specifically, we focus on the use of ICT in international business at the firm level in the context of foreign market expansion. Based on a systematic review of the literature, we demonstrate how the international business literature is falling behind other research streams (for details, see Special Issue of *Journal of International Business Studies* 2016 (Hazlehurst and Brouthers, 2018)). We reviewed studies at the interface between internationalization and digitalization that have been published in the top 50 academic management and business journals over the past 30 years (i.e., when Integrated Services Digital Networks (ISDN) became available to most businesses (Hazlehurst and Brouthers, 2018)). On this basis, we synthesize prior studies into a research framework and outline multiple research opportunities that scholars should consider taking up to better understand internationalization in the digital age.

2 Methodology

We undertook a domain-based systematic literature review to provide insights into current knowledge of the interface between internationalization and digitalization. We followed Paul and Criado (2020)'s guidelines and adapted a three-stage approach as described by (Tranfield, Denyer, and Smart, 2003;

Hazlehurst and Brouthers, 2018). We decided to conduct a systematic review for two reasons. First, a narrative review relies on a reviewer's knowledge, insights, and choices while a systematic review reduces reviewer bias (Hazlehurst and Brouthers, 2018). Second, we aim to critically discuss a specific research topic by integrating extant literature. In this context, a systematic review provides a framework for a rigorous overview of the relevant and impactful literature. In contrast, a narrative review provides experts with an experiential setting, which offers experts' intuitions about and perspectives on a specific topic greater freedom. Since the trend toward internationalization in the digital age is only just emerging, we consider a systematic review best suited to develop a research framework which helps the field of international business to build on (Paul and Criado, 2020).

Our three-stage process comprised (1) devising a detailed review plan, (2) conducting the actual literature search, and (3) systematically analyzing the relevant publications. The first stage involved defining the search terms, scope, and journals to be included in the analysis. The second stage consisted of executing the search and obtaining the results for closer scrutiny. The third stage involved systematically isolating and analyzing the relevant and most impactful articles in the field (Tranfield et al., 2003). Our three-stage process enabled us to synthesize the key contributions in the field and to identify the gaps in the existing literature for scholars to fill in the future (Webster and Watson, 2002).

Given that integrating digitalization into international business research is still at an early stage, we searched for articles on a broad basis. We used inclusive definitions of international business and digitalization. We did not limit our research to specific theoretical perspectives, dimensions, or stages in the internationalization process.

2.1 Protocol and Plan

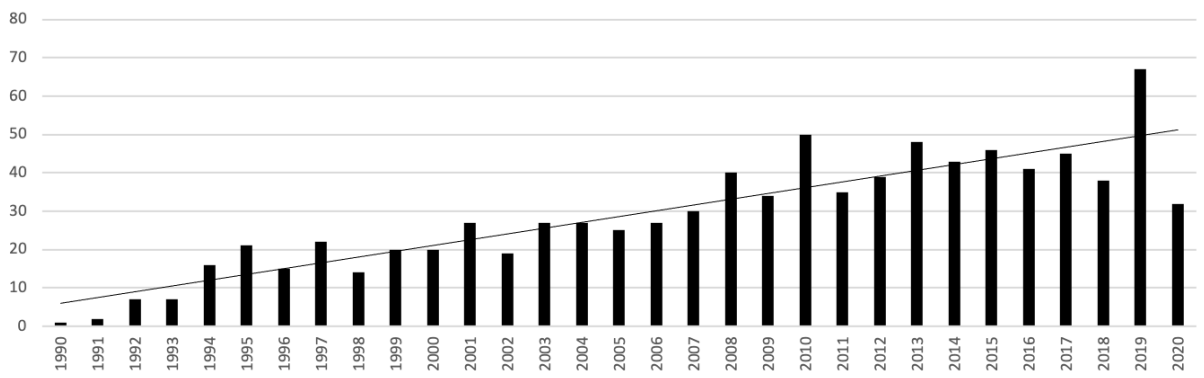
Our research protocol documents the keywords that we used in the literature search and the scope of the search. We divided the keywords (search terms) into two groups: *internationalization* and *digitalization* (see the appendix 6 for the keywords and their definitions). We limited our search to the top 50 journals in the category *Management* and *Business* as provided by the Web of Science Journal Citation Report 2018 (Web of Science, 2018). The ranking details for each category - Business - and - Management - can be found in Appendix 7.1. The 5-Year-Average Impact Factor cut-off in the category "Business" is 4.030 in the category "Management" 4.817. We only searched English-speaking articles published between 1990 and 2020. We used Web of Science, Google Scholar, and EBSCO Host. We searched the title, keywords, and abstract of every paper for our keywords.

2.2 Literature search

The literature search was conducted between July and September 2019 and updated in October 2020. We identified a total of 892 relevant publications. Two thirds of all publications were published after 2007. The trend over the past 10 years confirms the emerging research in the field of international business. The last three years yielded far more relevant publications than previous years. This underlines the increasing attention given to the interface between digitalization and

internationalization in the field. This positive trend is likely to continue as the average number of publications has been growing since the early 2000s. Figure 3 shows the number of publications per year and a trend line.

Figure 3: **Publications per Year**



2.3 Classification of publications

After completing our search, we classified every article based on its abstract in terms of general topics (Hutzschenreuter and Harhoff, 2020). We identified 12 topics and categorized publications accordingly (see table 2).

Table 2: **Publications by topic**

Themes	Number of publications
Business performance	32
Business strategy and General Management	46
Entrepreneurship	31
Foreign Markets, Market development, Location Choice, and FDI	73
Globalization	66
Innovation, knowledge Management, and organizational learning	131
International Business Strategy	34
Intra-firm level ICT application	79
Marketing and Sales	31
Other unrelated content	281
Supply chain, logistics, and manufacturing	30
Tourism Management and Travel	58
Total number of publications	892

After an initial review of the first 250 articles, we defined the topics as listed in table 2 (Drisko and Maschi, 2016). Topics were used as categories to which we assigned the reviewed publications while screening their abstracts. We attributed articles to a topic even if there was little evidence that the interplay between internationalization and digitalization was central. On completion, we screened the 12 categories again and summarized the key insights and trends for every category.

2.3.1 Business performance

Under this topic, we categorized all ICT- and business-outcome related literature. The 32 publications in this thematic area reflect the interest taken in this subject in international business research. Early research focused on the impact of ICT on firm performance (Powell and DentMicallef, 1997). Other authors investigated the impact on returns of specific business activities, such as strategic alliances (Arthur, 1996; Lavie, Haunschild, and Khanna, 2012), intangible assets (Kaplan and Norton, 2004), or returns on investment in big data (Ross, Beath, and Quaadgras, 2013). Generally, the business-performance-related literature has focused on the use of ICT in certain business processes arguing that digital services save time and costs. The dominant theoretical perspective in this thematic area is Resource-Based Theory or Transaction Cost Theory.

2.3.2 Business strategy and General Management

The 46 articles reviewed in this thematic area have focused on digitalization and its impact on the general strategic positioning of firms and their management. Topics include virtual work (Beyer and Browning, 1999), the relation between headquarters and subsidiaries (Dossi and Patelli, 2010), disruption and the impact of new technologies (Griffith and Myers, 2005), and digitalization as a competitive advantage (Cragg and Finlay, 1991; Drnevich and Croson, 2013).

2.3.3 Entrepreneurship

This thematic area (31 studies) has studied the use of digitalization by entrepreneurs and their businesses. Scholars have explored how digitalization is used in early stage ventures. Autio, Nambisan, Thomas, and Wright (2018) focused on ecosystems, while Mosakowski (1998) investigated firm resources and efficiency.

2.3.4 Foreign Markets, market development, location choice, and FDI

This topic includes studies on how digitalization enables firms to enter, manage, and choose foreign locations. This area totalled 53 studies. Bell, Filatotchev, and Rasheed (2012) focused on the pace of global capital market integration, Mariotti and Piscitello (1995) examined the information costs and the role of FDI locations for foreign investors, while (Kang and Kim, 2010) investigated the corporate governance disadvantage in the event of information asymmetries. In sum, publications in this area have focused on technologies enabling business activities across geographical distance. The dominant theoretical perspective is Transaction Cost Theory and a significant number of publications have a marketing focus.

2.3.5 Globalization

Studies in this area (66 publications) have concentrated on how digitalization impacts globalization at the firm, industry, or national level. Sanders and Carpenter (1998) focused on information-processing from an agency perspective, while Hitt, Hoskisson, and Kim (1997) investigated the degree of internationalization and the role of information in an international context. Most discussions

of globalization in this areas have emerged from research on digital service multinational firms (Banalieva and Dhanaraj, 2019). Scholars have examined the use of digital technologies as a facilitator or key enabler of growth and have focused strongly on transaction costs (Alcácer et al., 2016).

2.3.6 Innovation, knowledge management, and organizational learning

This thematic area focuses on using digitalization to create and distribute knowledge to the market either internally or externally. The body of research in this area has grown steadily to 131 publications. There has been a strong focus on innovation (Fagerberg, Fosaas, and Sapprasert, 2012), knowledge management (Paswan and Wittmann, 2009; Loebbecke and Myers, 2017), and organizational learning (Robey and Boudreau, 1999). A clear internationalization focus is often missing and is not central to this research.

2.3.7 International business strategy

The 34 studies found for this topic concentrate on the interface of digitalization and international business strategy. The main focus lies on new structures and processes, which enable accessing foreign markets on the one hand, yet increase global competition on the other (Alcácer et al., 2016). Other studies have examined digital platforms and ecosystems (Brouthers et al., 2016). In sum, this areas has centered on how digitalization impacts firms in an competitive environment.

2.3.8 Intra-firm level ICT applications

This topic includes publications on how digitalization impacts intra-firm processes. Totalling 79 articles, this is one of the smaller thematic areas. It includes studies on specific software tools and their impact on specific processes. For instance Doherty, Marples, and Suhaimi (1999) focused on strategic information systems planning, executive information systems (Mohan, Holstein, and Adams, 1990), or ERP systems and internal knowledge management (Bloom et al., 2014). This topic also includes studies on implementation success and technical suitability (Bergeron, Raymond, and Rivard, 2004). Regarding implementation success, some studies have focused in particular on national culture (Leidner and Kayworth, 2006; Samaddar and Kadiyala, 2006). Overall, studies in this area have focused on internal IT systems and have been less internationally focused.

2.3.9 Marketing and sales

Comprising 31 publications, work in this areas has focused on the use of digital technologies in marketing and sales research. Ellis (2003) studied the information gap between markets and international trade intermediaries. Navarro (2005) investigated the business cycle, Atuahene-Gima and Li (2000) explored marketing tactics and new product development, while Jing and Xie (2011) examined automated sales agent and information/knowledge sharing.

2.3.10 Other unrelated publications

The largest thematic area includes 281 unrelated publications, including studies we were unable to categorize into any of the aforementioned thematic areas.

2.3.11 Supply chain, logistics, and manufacturing

This thematic areas includes 30 publications. Located mainly in global value chain literature, these studies have focused on using digitalization in the global supply chain and logistics. Key topics include offshore partnering (Jean, Sinkovics, and Cavusgil, 2010), supply chains as competitive advantage (Hult, Ketchen, and Arrfelt, 2007), and international supplier management (Mahnke, Wareham, and Bjorn-Andersen, 2008).

2.3.12 Tourism management and travel

Work in this area has partly overlapped with marketing and sales but has been published mostly in tourism and hospitality journals. We identified 58 relevant articles, whose investigated topics include e-commerce (Buckley, 2008) or destination selection and cultural differences (Ng, Lee, and Soutar, 2007).

3 International Business results

After the initial search and categorization into topics, we analyzed international business journals in particular for relevant publications. Focusing on this literature narrowed down our analysis to international business and helped to identify existing achievements in the field as well as research gaps that need to be filled. We selected only those journals containing one or more articles whose abstracts matched our keywords (see below).

Based on the selection, we assessed every article in detail, in particular whether it had a clear digital focus (i.e., a hypothesis or central role in theory). This filtered subset of journals enabled distinguishing publications theorizing and testing digitalization-related topics from those focusing on other issues. Table 3 presents the number of papers published in international business journals and the filtered subset. It also indicates the lack of research in the field of international business. Only nine studies concentrated on digitalization. Following Paul and Criado (2020), we subsequently analyzed the theory, methodology, constructs, and context of these studies.

Table 3 illustrates the diffusion in the field. On the one hand, 74 articles (full list is available in the Appendix 7) referred to digitalization in their abstracts but did not focus on this topic either theoretically or empirically. Only a small number of studies (12 %) in the field of international business have a clear digital focus. Thus, the field is only just beginning to explore the impact of digitalization and lags behind other fields (Alcácer et al., 2016; Hazlehurst and Brouthers, 2018).

More than two third of the studies (7 out of 9) identified in this subset focus on how digitalization impacts the internationalization process. The dominant perspective is the Upsalla Model (i.e., Coviello et al. 2017; Chen, Shaheer, Yi, and Li 2019; Monaghan, Tippmann, and Coviello 2020). Other studies examine firms' ability to detect and respond to changes in the external market

Table 3: IB journals and digital focus

Journals	Number of publications	Digital core focus
Academy of Management Journal	4	
Journal of Information Technology	1	
Journal of International Business Studies	46	7
Journal of Management	1	
Journal of Management Studies	1	
Journal of Business Research	5	
Journal of World Business	6	1
Management Science	2	1
Strategic Management Journal	8	
Total	74	9

environment. Tambe, Hitt, and Brynjolfsson (2012) gathered detailed data on the organizational practices and information technology of 253 firms and empirically tested their impact on these firms' external focus, decentralization, and productivity. The authors also found that information access enhances a firm's standing in an decentralized market environment. Rangan and Sengul (2009) considered transnational integration and the use of ICT. In this context, cross-border exchange and imperfectly distributed information are well-known cost drivers in multinational enterprise theory. Rangan and Sengul (2009) was the first study to empirically explored the role of ICT in the context of transnational exchange. It thus contributed to internationalization theory and extended the transaction cost economics perspective. On a more general level, Buckley and Hashai (2004) focused on the location and control strategies of firms and paid special attention to the role of information technology. This perspective describes the impact of digitalization on the modern business world where locations and value-adding activities are connected by information flows and products. The authors contributed to the theories of internationalization and MNEs on a more general level. Banalieva and Dhanaraj (2019) extended this research stream by focusing on how digitalization alters internationalization theory's assumption of firm specific advantages (FSA) and governance choices in international transactions. Their findings contributed to the transaction cost perspective by showing that while transaction costs can be reduced by digitalization, they also open up opportunities for more efficiently coordinating activities within a business network. Ultimately, this study provided initial empirical evidence that firms can leverage digitalization for internationalization depending on their FSAs. Erumban and de Jong (2006) focused on the role of culture in the context of ICT adoption rates on country level. The results provide strong evidence that national culture and ICT adoption are closely related. Power distance and uncertainty avoidance have been identified as the most important factors. This article contributed mainly to the understanding of ICT adaption and usage on country level. This sharpens IB scholars understanding to consider country and cultural in their further research.

We found that the majority of articles on international business were theoretical or conceptual i.e., Alcácer et al. (2016). The empirical publications in this subset were mostly questionnaire-based. Data access was often mentioned as a factor limiting further research. In terms of analytic techniques, most of the reviewed empirical studies used established statistical methods such as Ordinary least squares (OLS), general least squares (GLS) or logistic regression.

The following table 4 lists the nine articles which we identified with a core focus on the interface between internationalization and digitalization.

Table 4: IB Literature with Digital Focus

Author	Title	Journal	Publication Year	DOI
Buckley, PJ; Hashai, N	A global system view of firm boundaries	J. Int. Bus. Stud.	2004	10.1057/palgrave.jibs.8400059
Rangan, S; Sengul, M	Information technology and transnational integration: Theory and evidence on the evolution of the modern multinational enterprise	J. Int. Bus. Stud.	2009	10.1057/jibs.2009.55
Alcacer, J; Cantwell, J; Piscitello, L	Internationalization in the information age: A new era for places, firms, and international business networks?	J. Int. Bus. Stud.	2016	10.1057/jibs.2016.22
Coviello, N; Kano, L; Liesch, PW	Adapting the Uppsala model to a modern world: Macro-context and microfoundations	J. Int. Bus. Stud.	2017	10.1057/s41267-017-0120-x
Banalieva, ER; Dhanaraj, C	Internalization theory for the digital economy	J. Int. Bus. Stud.	2019	10.1057/s41267-019-00243-7
Chen, L; Shaheer, N; Yi, JT; Li, SL	The international penetration of ibusiness firms: Network effects, liabilities of outsidership and country clout	J. Int. Bus. Stud.	2019	10.1057/s41267-018-0176-2
Monaghan, S; Tippmann, E; Coviello, N	Born digitals: Thoughts on their internationalization and a research agenda	J. Int. Bus. Stud.	2020	10.1057/s41267-019-00290-0
Erumban, AA; de Jong, SB	Cross-country differences in ICT adoption: A consequence of Culture?	JOURNAL OF WORLD BUSINESS	2006	
Tambe, P; Hitt, LM; Brynjolfsson, E	The Extroverted Firm: How External Information Practices Affect Innovation and Productivity	Manage. Sci.	2012	10.1287/mnsc.1110.1446

In the period investigated, an increasing number of publications have offered new insights into internationalization in the digital age and into how this development affects firm-level outcomes. However, research linking digitalization and internationalization remains rare. Two comments are therefore in order. First, empirical evidence is needed to provide promising findings to open up a new research stream in the field of international business. Second, research should continue to integrate findings from other, more advanced fields.

4 How the IB field can advance from MIS and IS insights

Journals such as Management Information Science (MIS) and Information Science (IS) focus on a functional level of business activities. However, knowledge transfer to the IB field is still missing (Drnevich and Croson, 2013). The main dichotomy between the MIS and IS literature and international business lies in integrating digitalization. Regarding firm-level outcomes, internationalization indicates a substantial theoretical disconnect (see (Bharadwaj, 2000)). It is not surprising that this disconnect hampers the ability to advance knowledge in the field of international business and beyond. The gap between MIS / IS literature and the international business field must be bridged. Doing so is possible for two reasons.

First, MIS and IS research explains why and under what conditions IT / digital services capture or create value based on current non-digital capabilities (Drnevich and Croson, 2013; Mithas, Tafti, Bardhan, and Goh, 2012). Already over a decade ago, IT business value (ITBV) scholars noted that "Once acquired, ICT does for free what intermediaries do for a fee" (Cordelia, 2006, p.199). For instance, price transparencies can be identified significantly better with the help of ICT. Such enhancements, driven by ICT, substantially alter the firm's competitive position by reducing search costs and by creating price transparency (Alcácer et al., 2016; Brynjolfsson, Geva, and Reichman, 2016). Recent developments (e.g., shopping bots) increase price transparency and rivalry among competitors to the maximum in a market. For companies in dynamic environments or in hyperturbulent markets (Ning and Tanriverdi, 2017), such ICT capabilities enhance their standing. The MIS literature also offers insights into enhanced coordination and monitoring. Bloom et al. (2014) found that ICT enables firms to centralize knowledge and to increase their span of control while granting personnel more autonomy.

In sum, the MIS and IS literature provides insights into the impact of ICT on upstream and downstream activities, which can be integrated into the field of international business. For instance,

monitoring and control mechanisms as well as price information across markets are central to Agency Theory, Transaction Cost Theory, and Internationalization Theory.

Second, the existing ITBV literature shows that new digital capabilities alter the business-level strategic alternatives of value-creation opportunities and impact their risk and reward. In the digital age, where e-commerce is becoming the new standard, the effective and efficient use of ICT is a key business level strategy (Bharadwaj, 2000; Bharadwaj et al., 2013; Alcácer et al., 2016). Technology has enabled (and continues to enable) the new "superpowers" (e.g., Amazon and Google) to reshape whole industries globally. These incumbents change markets fundamentally by driving prices down to average costs, and by eliminating economic profits for traditional market participants in many sectors. Whole industries may change into contestable markets. New market participants barely exist and, if they do enter the market, face destruction — in what has been called the Amazoned Effect (Drnevich and Croson, 2013). Such value-creation processes of out-competing incumbents by ICT-enabled technology create new opportunities and redefine the risks faced by firms. Bharadwaj (2000); Bharadwaj et al. (2013) argued that IT resources and capabilities are an important means of gaining a sustainable competitive advantage. In particular how firms leverage their digital capabilities is becoming increasingly important. From a resource-based perspective, IT components can be easily duplicated and IT investments constitute no competitive advantage per se. IT capabilities and IT skilled top management teams are heterogeneously distributed among market participants. Thus, the right combination of IT resources and capabilities as well as the implementation into one's overall business strategy may serve as an sustainable competitive advantage.

In this light, the field of international business should utilize the overlap between MIS / IS and IB research. We identified overlapping theories central to both fields (e.g., Transaction Cost Theory, Agency Theory, Trade Theory, Resource Based Theory). These theories establish a common ground for bridging the two related, yet currently disconnected fields. Table 5 illustrates the core concepts of international business and the key theoretical perspectives that have been used in prior MIS / IS literature.

Table 5: **Integration of MIS / IS with IB Theoretical Perspectives**

Theory Perspective	Core Theories	IB Mechanism	Intellectual Heritage	Integration MIS Research
Coordination	I/O Economics, Trade Theory	<i>Market Power</i> : Colluding to restrain rivalry and restrict new market entries	Porter 1998; Madon 1999	Finnegan and Longaigh 2002; Brynjolfsson and Hitt 2003; Mithas et al. 2012
Governance	Transaction Cost Theory, Agency Theory	<i>Efficiency Rents, Transaction Costs</i> : Efficiently allocating resources to create or capture value from imperfect markets	Hymer 1960; Williamson 1975; Buckley and Casson 1976	Liang, Saraf, Hu, and Xue 2007; Rangan and Sengul 2009; Rai, Arkan, Pye, and Tiwana 2015
Competence	Ressource Based View, Knowledge Based View	<i>Operational-Efficiency Rents</i> : Exploiting resources to create of capture value from imperfect markets	Barney 1991, 2001	Brynjolfsson and Hitt 2003; Bharadwaj 2000; Bharadwaj et al. 2013; Ray, Barney, and Muhanna 2004; Tippins and Sohi 2003
Flexibility	Dynamic Capabilities, Real Options	<i>Dynamic Capabilities and Flexibility</i> : Preserving or improving value and market position by leveraging superior adaptation skills	Teece, Pisano, and Shuen 1997	Bharadwaj 2000; Sambamurthy, Bharadwaj, and Grover 2003; Ning and Tanriverdi 2017

Adapted from Drnevich and Croson (2013)

The main leanings are summarized in the list below.

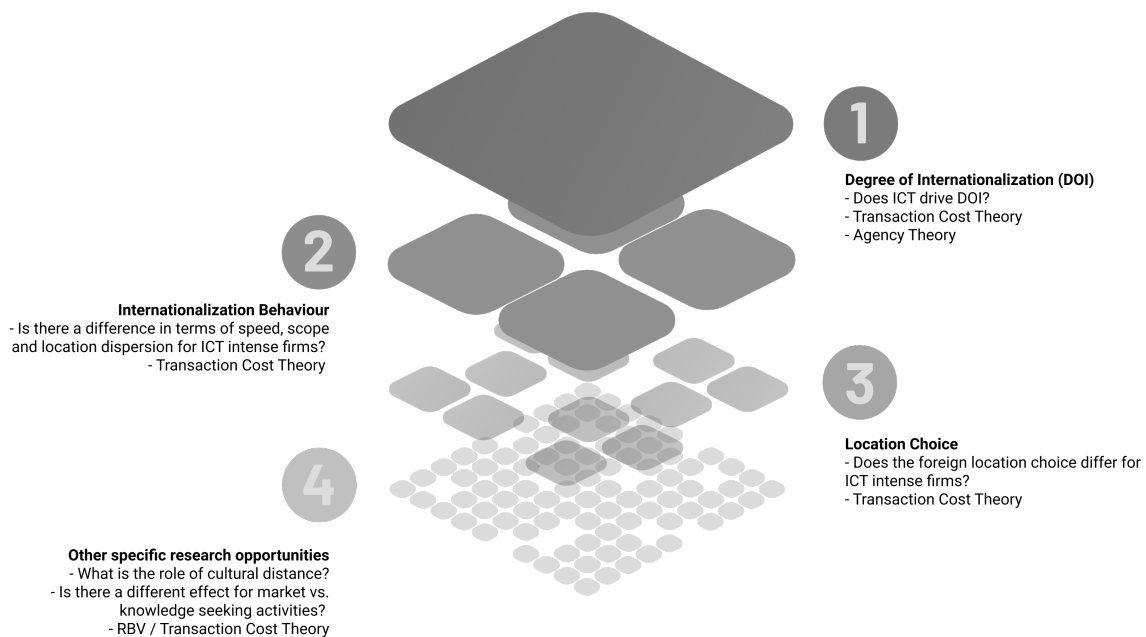
- ICT reduces transaction costs on functional level. Coordination and Governance becomes more transparent and less costly. This has implications for the IB field, in particular for Transaction Cost Theory and Internationalization Theory driven research.
- MIS research provides deep understanding of ICT mechanisms which create or capture value. These findings can be bridged to IB field which builds on RBV and Competence based theories.
- MIS points out the key role of Dynamic Capabilities and Flexibility which have significant impact on the strategic positioning of an international firm. Dynamic Capabilities scholars in the IB field should include ICT related mechanisms to keep pace with the MIS research and other fields like marketing.

5 Research gaps and important directions for future IB research

Based on our review, we identified key research gaps in the international business field. Whereas some fields (e.g., MIS / IS or marketing) have made good progress in exploring the impact of digital technologies, international business research has been less enterprising. Although some authors have indicated the importance of integrating theory and practice (e.g., Alcácer et al. (2016); Ray, Xue, and Barney (2013)), no robust framework for further research exists to date.

Below, we present a research framework that will hopefully help to investigate the impact of ICT on different levels of international business research, figure 4. Ideally, this framework will contribute to advancing understanding in a structured manner by following a top-down strategy. Top-down means pursuing a comprehensive future research agenda on four levels. First, we focus on the most general level, i.e., the degree of internationalization. Second, we discuss the impact on internationalization behaviour. Third, we discuss integrating ICT into studies on international location choice decisions. Finally, we provide further important research directions for culture, institutions, and business strategy. The proposed research framework is shown in figure 4. Following Paul and Criado (2020)'s recommendations, we then develop and discuss the identified research gaps and their possible integration into the four layers.

Figure 4: **Research framework**



5.1 Degree of internationalization

The first layer of our framework focuses on the *Degree of Internationalization* (DOI). Ultimately, DOI is one of the main outcome variables in international business research. On the one hand, scholars have focused on what drives DOI (e.g., Buckley and Casson (1976); Ruigrok, Georgakakis, and Greve (2013); Knight and Liesch (2016); Vahlne and Johanson (2017)). On the other, research has focused on the firm-level (i.e., performance) consequences of DOI (e.g., Abdi and Aulakh 2018).

Rooted in the framework of markets and hierarchies (Hymer, 1960; Williamson, 1975), internalization theory explains why MNEs exist, and why organizations expand beyond national borders. So far, IB scholars have argued that firms exploit their FSAs across borders in order to capture or generate value from imperfect markets (Buckley, 1988; Buckley and Casson, 2009). "An MNE is created when a firm can increase its value by internalizing markets for certain of its intangible assets across national borders" (Kirca, Hult, Roth, Cavusgil, Perry, Akdeniz, Deligonul, Mena, Pollitte, Hoppner, Miller, and White, 2011, p.48).

Despite 30 years of academic research in international business, the link between ICT and the scope of internationalization has still not been established (for an exception, see Mithas et al. (2017)). Based on our review, this research gap results from the disconnect between the ITBV literature and international business. First, digital innovations can play several roles, which substantially improve firm competencies (for a detailed discussion, see Drnevich and Croson (2013)). Second, the IB and strategy literature has neglected the potential impact of ICT as far as the central role of FSA is concerned (Hazlehurst and Brouthers, 2018). The existing constructs, which are still used to explain the causes and consequences of internationalization, which ultimately results in DOI, continue to ignore digitalization.

Based on the reviewed publications, we suggest that ICT reduces uncertainty and creates more transparency and coordination, ex-post and ex-ante, in the internationalization process. Such advantages will help the firm to improve governance and to overcome transaction-cost challenges in the process of international expansion – thereby increasing the firm's scope of internationalization and other firm level outcomes (e.g., firm performance). MIS scholars have theoretically and empirically investigated the impact of ICT on subprocesses potentially impacting the DOI due to faster information access (e.g., shopping bots), greater transparency along the value chain, and more monitoring capabilities. The majority of MIS scholars have focused on functional or project-level research by assessing the impact of ICT from a transaction cost perspective (Drnevich and Croson, 2013). The empirical findings in international business research show that both internal and external transaction cost drivers impact a firm's international business strategy.

New findings in the top layer of our framework – DOI – would contribute to the international business literature in three distinct ways. First, new findings would contribute to the ongoing discussion about the role of internationalization in the digital age by demonstrating that ICT fosters international business and impacts firms' international business position. Second, new insights would help IB scholars to further develop theories related to transaction cost theory in this context. Our review found that transaction cost theory has been one of the most frequently used theoretical perspectives in the context of DOI (Kirca et al., 2011). Third, this systematic literature review bridges the two independent fields and provide a first basis for further research in international business.

5.2 Internationalization behavior

Extant IB research has focused on the internationalization behavior of firms. Such behavior involves the speed, scope, and location dispersion of foreign business activities (i.e., FDI) (Lu, Liu, Wright, and Filatotchev, 2014; Verbeke and Asmussen, 2016; Alcácer et al., 2016; Monaghan and Tippmann, 2018). Deal size, speed, and utilization of internationally connected networks have become major sources of competitive advantage in the internationalization process (Chang and Rhee, 2011). The impact of ICT on inflowing Foreign Direct Investment (FDI) is well recognized in the economic geography literature while little is known about this phenomenon in outflowing FDI on the firm level (Alcácer et al., 2016; Buonafede, Felice, Lamperti, and Piscitello, 2018). According to Mudambi, Li, Ma, Makino, Qian, and Boschma (2018), the combined effect of local knowledge sourcing and global integration enables MNEs to gain a global competitive advantage. This advantage results from the ability to create and integrate diverse knowledge pools while distributing the resulting products and services on a global basis.

The field of international business is lagging behind other research in this respect and has only recently begun assessing the impact of ICT in the context of internationalization behavior (Drnevich and Croson, 2013; Alcácer and Chung, 2014; Hazlehurst and Brouthers, 2018). Over the past decade, research has generated new insights into how ICT affects Global Value Chain (GVC) (Gooris and Peeters, 2015), monitoring capabilities (Alcácer et al., 2016), and knowledge creation and distribution (Bloom et al., 2014). Despite these significant contributions, international business scholars have often neglected the role of ICT and have similarly paid insufficient attention to developments outside their research field. More attention to the interaction between ICT and the internationalization process and behavior (i.e., the second layer in our framework) would advance research on internationalization speed, scope, and location dispersion.

On the level of theory, MIS / IS literature can be integrated by showing that ICT reduces uncertainty in the internationalization process. This enhances a firm's ability to expand its foreign business with less investment, albeit faster and with a wider geographical scope. The resulting advantage of ICT helps firms to centralize knowledge and distribute information at significantly lower costs. Such advantages will help the firm to enhance its flexibility and standing in a diverse, competitive, and digital environment.

New findings about transaction cost drivers (e.g., speed and scope; the second layer in our framework) would advance research on internationalization behavior. Such findings would contribute to international business research in two main ways. First, ICT might strongly impact key cost drivers. Internationalization speed and scope as well as location dispersion might be redefined in the digital age (Alcácer et al., 2016). Bridging the findings from MIS and IS literature to those specific cost drivers would help to generalize existing studies on FDI speed, scope, and location dispersion and beyond. Second, despite the theoretical importance of focusing more specifically on transaction cost drivers in the internationalization context, no study has yet explored the key role of ICT according to our review. Integrating ICT is an important contribution for transaction-cost-driven international business research as well as for related fields like Joint Ventures or M&A research. Ultimately, integrating ICT into precise cost drivers would also offer new avenues for further IB and MIS research.

5.3 Location choice

In the third layer, ICT opens up new research opportunities to focus on firms' location-specific behavior. Location choice decisions would make an interesting research endeavor, since new databases in this area provide city-level FDI data (Castellani and Lavoratori, 2019). Based on our review, important contributions might result from such studies for three main reasons. First, location choices for foreign direct investments (FDI) have been a key topic in international business research for over two decades. On the one hand, colocation decisions provide positive externalities (e.g., skilled labor, knowledge spillovers); on the other, such decisions might be strongly impacted by ICT (Alcácer et al., 2016).

Their inherent focuses have led MIS research and the international business literature to ignore each other. Consequently, our understanding of the relationship between ICT and colocation strategies remains incomplete. None of the reviewed articles addresses the interplay between these fields empirically. Banalieva and Dhanaraj (2019) argued that the source of FSA shifts from the concept of physical location to the firm's ability to exchange information across geographical space. ICT plays a key role in information exchange and in coordinating business activities as outlined in the MIS literature (Drnevich and Croson, 2013).

Arguably, ICT increases the degree of freedom in choosing locations. ICT reduces transaction costs and increases information exchange, which both become more important than physical location. Thus, we expect less colocation behavior given a high level of ICT on the firm level. From a theoretical perspective, the overlapping of transaction cost arguments and agency theory between the MIS / IS and the IB literatures could be used to advance knowledge.

Integrating MIS / IS research and IB into location choice (our third layer) would enhance knowledge in international business in three distinct ways. First, the results might show that firms can choose from a wider range of location options by leveraging ICT. In this regard, we contribute to the currently evolving discussion on digitalization in the field of international business. Second, by focusing on city agglomerations our analysis extends beyond the country level, the hitherto established, yet limited unit. Zooming-in on the city level enables more rigorous empirical analysis (Mudambi et al., 2018). Third, our literature review helps to bridge the theoretical findings of the MIS literature with those of international business research.

5.4 Other specific research opportunities

Beyond the three levels of IB research, the impact of digitalization on firm-level outcomes might be influenced by other factors such as cultural distance and business type activity. Cultural distance and business type activity are both well established constructs in our research field and the MIS / IS literature. Thus, carefully considering combining culture and ICT is important for further research and provides new opportunities for additional contributions in both fields.

Previous international business studies have identified cultural distance as a main transaction cost driver between two markets, i.e., home and host market (Shane, 1994; Dunning, 1998; Erumban and de Jong, 2006; Johanson and Vahlne, 2009; Beugelsdijk and Welzel, 2018). Cultural distance describes the distance between two countries along multiple dimensions. Generally, cultural distance

is defined as the values, norms, and beliefs, as well as the behavioral patterns of two or more different nationalities (Leung, Bhagat, Buchan, Erez, and Gibson, 2005).

The impact of cultural distance has been recognized in both the MIS / IS literature and the IB literature. On the one hand, the MIS / IS literature has outlined the role of culture on the national and the organizational level. Feldman and March (1981) and Scholz (1990) found that IT is symbolic and thus subject to cultural interpretations. Leidner and Kayworth (2006) showed that IT-culture conflicts may arise and thus hamper the benefits of IT projects. Such an IT-culture conflict may arise due to contradicting values and beliefs between the embedded IT and the user. Another potential source of IT-conflict results from a different perception of IT components. For instance, ERP systems are designed to reduce uncertainty along the value chain and to promote efficiency (Kim, Mithas, and Kimbrough, 2017). The positive impact decreases on average if the users of such ERP systems experience low uncertainty avoidance. In other words, a cultural background with a low level of uncertainty avoidance might perceive system documentation as a time-consuming burden and less necessary than users from a culture with high uncertainty avoidance. Erumban and de Jong (2006) findings extend this perspective by providing empirical results that power distance and the uncertainty avoidance matter most for ICT adaption on country level. On the other hand, cultural distance is well documented in the international business literature. Cultural distance is a central component of the concept of liability of foreignness (LOF) (Beugelsdijk, Kostova, Kunst, Spadafora, and van Essen, 2018) and of the related FDI literature.

Based on the above findings and our review, we highly recommend heeding the interplay between internationalization, digitalization, and culture. While culture might play a key role in the success of ICT, it also enables firms to address cultural differences more easily than ever. For example, Netflix, an online streaming platform, uses a significantly different web design for its customers in Latin America and Europe. Such culture-specific adjustments enable Netflix to respond to different cultural preferences. Future research should investigate mechanisms in which technology can help to overcome cultural barriers or impede positive effects.

While both fields examine the role of culture, much MIS / IS research is limited to segregated business processes. Such market- or knowledge-seeking activities also play an important role in firms' internationalization process. Integration on the firm level opens up promising research opportunities. The effect of ICT on international business processes might differ for market- and knowledge-seeking activities for two reasons.

First, market-seeking activities require a different set of competencies and governance than knowledge-seeking activities. Market-seeking activities, such as sales or customer support, require specific information about markets and customers in order to achieve firms' strategic goals. The MIS / IS literature has provided insights into knowledge management systems that support such market-seeking activities (Ravichandran, Han, and Mithas, 2017). Moreover, coordinating between HQs and subsidiaries can be streamlined by ICT (Bloom et al., 2014). In addition, MIS research has suggested that ICT will enable firms to respond even more flexibly and faster to changes in the market (Sabherwal and Jeyaraj, 2015; Alcácer et al., 2016). Such advantages improve firms' coordination, governance, and flexibility in an international context. In conclusion, market-seeking activities benefit from fast and targeted knowledge access.

Second, in contrast to market-seeking activities, knowledge-seeking ones require different ICT configurations. Knowledge-seeking activities benefit from enhanced knowledge creation and collaboration across international knowledge sources. The MIS literature has provided evidence that ICT helps firms to cope with the challenges they face when scaling their R&D internationally (Ravichandran et al., 2017). This in turn supports firms in accessing globally distributed knowledge hubs and locally rooted knowledge. Thus, ICT enhances collaboration and communication between knowledge-seeking activities. Such advantages enhance the firm's innovation power and might be a source of an IT-based competitive advantage (Bharadwaj, 2000; Bharadwaj et al., 2013). In sum, knowledge-seeking activities require a different ICT configuration, which enhances collaboration across globally distributed knowledge sources.

Based on this literature review, we suggest that further research take into account the divergent impact of ICT and the type of business activity as this would open up additional research opportunities in the field of international business. ICT provides firms with access to geographically dispersed knowledge at significantly lower transaction costs. This might impact firms' location choices as well as the speed and scope of their FDIs.

6 Summary and Conclusion

Our systematic review is the first of its kind to propose multiple avenues for integrating digitalization into international business research. Despite public awareness and the increasing presence of digital solutions, international business research still lags behind other fields. Although this missing integration has been recognized (Alcácer et al., 2016; Hazlehurst and Brouthers, 2018), we found only nine studies that have addressed the role of digitalization in the international context.

This review has synthesized the literature and identified three main gaps in international business research with regard to integrating digitalization. Furthermore, the role of two key concepts (cultural distance and business type activity) has been discussed. In this context, we provide recommendations on how digitalization might be integrated into international business research on different layers, ranging from the overall degree of internationalization to the impact on city-level location choice. We have aimed to advance knowledge about internationalization in the digital age and to fill the existing gaps. To this end, we have established different layers on which further contributions can be made based on our findings. In particular, we have outlined that integrating the findings of the MIS / IS literature into present knowledge can significantly contribute to advancing internationalization theory in three ways: First, by helping to understand what drives the degree of internationalization (DOI); second, by explaining differences between firms' internationalization behavior in terms of speed, scope, and location dispersion. Third, by shedding new light on location choices in foreign countries.

In conclusion, this review provides a basis for further research. It contributes to the increasing body of research on internationalization in the digital age and responds to the repeated calls for further research; see, for instance, the call of the *Journal of International Business Studies – Special Issue on IB in a Digital World* (JIBS, 2020).

We are confident that further research on the interface between digitalization and internationalization can fundamentally redefine existing constructs such as the role of FSA. We hope that our

suggestions and the outlined research opportunities will motivate international business scholars to contribute to this upcoming research stream.

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7 Appendix

Table 6: Keywords

Internationalization	Digitalization
”international business” OR ”foreign business” OR ”internationalization” OR ”foreign direct investment ” OR ”FDI” OR ”cross border” OR ”foreign market entry” OR ”international management” OR ”cultur*” OR ”cultural distance ” OR ”location choice” OR ”Degree of internationalization” OR ”knowledge seeking” OR ”asset seeking” OR ”cluster”	”ICT” OR ”information and communication technolog* ” OR ”digital*” OR ”information technolog*” OR ”information”

7.1 Web Of Science Journal Ranking

Journal Data Filtered By: Selected JCR Year: 2018 Selected Editions: SSCI Selected Categories: 'MANAGEMENT' Selected Category Scheme: WoS

Rank	Full Journal Title	Total Cites	Journal Impact Factor	5-Year Impact Factor	Eigenfactor Score
1	Academy of Management Annals	3,693	12.289	18.616	0.009790
2	ACADEMY OF MANAGEMENT REVIEW	35,903	10.632	14.170	0.011690
3	JOURNAL OF MANAGEMENT	22,640	9.056	12.909	0.022860
4	ORGANIZATION & ENVIRONMENT	1,722	8.500	8.551	0.001700
5	ADMINISTRATIVE SCIENCE QUARTERLY	19,327	8.024	10.360	0.008750
6	JOURNAL OF OPERATIONS MANAGEMENT	10,651	7.776	10.161	0.006330
7	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	15,419	7.724	9.713	0.008020
8	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	4,174	7.600	10.017	0.003700
9	ACADEMY OF MANAGEMENT JOURNAL	39,363	7.191	11.891	0.029750
10	Annual Review of Organizational Psychology and Organizational Behavior	984	7.179	11.381	0.005340
11	Journal of Supply Chain Management	2,887	7.125	9.841	0.003120
12	PERSONNEL PSYCHOLOGY	7,753	6.930	7.923	0.005570
13	ORGANIZATIONAL RESEARCH METHODS	6,139	6.551	10.926	0.006910
14	Business Strategy and the Environment	5,266	6.381	7.557	0.002200
15	TOURISM MANAGEMENT	20,615	6.012	7.581	0.012610
16	JOURNAL OF MANAGEMENT STUDIES	11,622	5.839	7.924	0.008730
17	HARVARD BUSINESS REVIEW	18,160	5.691	6.132	0.013090
18	LEADERSHIP QUARTERLY	10,030	5.631	6.841	0.007940
19	STRATEGIC MANAGEMENT JOURNAL	34,978	5.572	8.356	0.027150
20	Corporate Social Responsibility and Environmental Management	2,809	5.513	7.131	0.001220
21	RESEARCH POLICY	23,214	5.425	7.352	0.018800
22	OMEGA-INTERNATIONAL JOURNAL OF MANAGEMENT SCIENCE	8,781	5.341	6.318	0.009470
23	TECHNOVATION	5,957	5.250	5.622	0.002910
24	INTERNATIONAL JOURNAL OF PHYSICAL DISTRIBUTION & LOGISTICS MANAGEMENT	4,483	5.212	5.704	0.002100
25	JOURNAL OF APPLIED PSYCHOLOGY	38,675	5.067	7.508	0.021580
26	CALIFORNIA MANAGEMENT REVIEW	5,667	5.000	5.331	0.002260
26	JOURNAL OF ORGANIZATIONAL BEHAVIOR	12,028	5.000	6.533	0.010240
28	INDUSTRIAL MARKETING MANAGEMENT	9,758	4.779	5.088	0.006010
29	Operations Management Research	332	4.727	3.510	0.000370
30	INTERNATIONAL JOURNAL OF PROJECT MANAGEMENT	9,382	4.694	5.617	0.006030
31	Journal of Knowledge Management	4,349	4.604	4.488	0.001800
32	MIS QUARTERLY	17,042	4.373	9.608	0.009900
33	SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL	5,566	4.296	7.462	0.003030
34	MANAGEMENT SCIENCE	33,333	4.219	5.555	0.046700
35	INFORMATION & MANAGEMENT	7,129	4.120	5.346	0.004600
36	INTERNATIONAL JOURNAL OF OPERATIONS & PRODUCTION MANAGEMENT	7,637	4.111	5.604	0.003450
36	Organizational Psychology Review	472	4.111	3.986	0.001670
38	Management Accounting Research	2,823	4.044	6.612	0.001030
39	JOURNAL OF TECHNOLOGY TRANSFER	2,957	4.037	4.342	0.002810
40	JOURNAL OF STRATEGIC INFORMATION SYSTEMS	1,665	4.000	4.851	0.001100
41	International Journal of Contemporary Hospitality Management	4,672	3.957	4.531	0.003300
42	Research in Organizational Behavior	3,851	3.955	5.429	0.001660
43	Academy of Management Perspectives	2,954	3.857	8.932	0.004770
44	Journal of Destination Marketing & Management	994	3.800	4.675	0.001130
45	JOURNAL OF PRODUCT INNOVATION MANAGEMENT	6,596	3.781	5.824	0.005660
46	Journal of Intellectual Capital	2,591	3.744	Not Available	0.000520
47	International Small Business Journal-Researching Entrepreneurship	2,961	3.706	4.946	0.002580

48	HUMAN RESOURCE MANAGEMENT REVIEW	2,086	3,625	4,704	0.002290
49	SMALL BUSINESS ECONOMICS	7,096	3,555	4,452	0.006470
50	Electronic Markets	874	3,553	3,487	0.000880
51	ORGANIZATION STUDIES	8,184	3,543	5,240	0.007890
52	CORPORATE GOVERNANCE-AN INTERNATIONAL REVIEW	3,289	3,390	4,408	0.001780
53	INTERNATIONAL JOURNAL OF FORECASTING	4,510	3,386	3,295	0.006720
54	HUMAN RELATIONS	9,176	3,367	4,360	0.006700
55	LONG RANGE PLANNING	4,841	3,363	5,404	0.002740
56	Academy of Management Learning & Education	2,868	3,274	4,902	0.001970
57	ORGANIZATION SCIENCE	19,658	3,257	5,614	0.019220
58	BRQ-Business Research Quarterly	255	3,250	3,125	0.000280
59	Journal of Service Management	1,754	3,230	4,953	0.001820
60	JOURNAL OF INFORMATION TECHNOLOGY	1,392	3,225	4,817	0.001650
60	Journal of Family Business Strategy	795	3,225	4,229	0.001200
62	Journal of Business Logistics	2,888	3,171	6,086	0.001870
63	Public Management Review	2,976	3,162	4,184	0.004250
64	Industry and Innovation	1,427	3,157	2,749	0.001580
65	INTERNATIONAL JOURNAL OF HUMAN RESOURCE MANAGEMENT	7,678	3,150	3,457	0.006030
66	JOURNAL OF SMALL BUSINESS MANAGEMENT	4,039	3,120	4,545	0.002630
67	Strategic Organization	1,359	3,109	4,550	0.002240
68	GROUP & ORGANIZATION MANAGEMENT	2,557	3,104	4,079	0.001940
69	Journal of Purchasing and Supply Management	1,785	3,089	5,516	0.001400
70	JOURNAL OF MANAGEMENT INFORMATION SYSTEMS	4,899	3,013	4,560	0.003510
71	Journal of Hospitality Marketing & Management	1,308	3,011	Not Available	0.001090
72	Human Resource Development Quarterly	1,482	3,000	3,694	0.000670
73	European Management Journal	3,775	2,985	3,606	0.002660
74	Strategic Entrepreneurship Journal	1,770	2,956	5,410	0.001990
75	HUMAN RESOURCE MANAGEMENT	3,843	2,934	4,341	0.003410
76	ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES	11,555	2,908	4,149	0.007840
77	Human Resource Management Journal	1,026	2,843	3,227	0.001630
78	Journal of International Management	1,742	2,830	3,763	0.001430
79	International Journal of Logistics-Research and Applications	1,083	2,828	2,719	0.000740
80	BRITISH JOURNAL OF MANAGEMENT	4,496	2,750	4,619	0.003500
81	Asia Pacific Journal of Management	2,604	2,737	3,858	0.001970
82	Global Strategy Journal	901	2,730	3,886	0.001420
83	ORGANIZATION	3,164	2,704	3,709	0.003150
84	MANAGEMENT INTERNATIONAL REVIEW	2,227	2,689	3,164	0.001470
85	M&SOM-Manufacturing & Service Operations Management	2,581	2,667	3,462	0.005260
86	Journal of Manufacturing Technology Management	1,854	2,642	Not Available	0.000900
87	Cross Cultural & Strategic Management	183	2,619	2,619	0.000260
88	OPERATIONS RESEARCH	13,584	2,604	3,460	0.012950
89	European Journal of Work and Organizational Psychology	3,152	2,598	3,698	0.004630
90	International Entrepreneurship and Management Journal	1,311	2,537	2,916	0.001130
91	Journal of Hospitality and Tourism Management	937	2,496	Not Available	0.000800
92	Cornell Hospitality Quarterly	1,351	2,492	3,851	0.001440
93	Human Resource Development Review	1,028	2,487	2,586	0.000400
94	Tourism Management Perspectives	1,241	2,485	Not Available	0.001870
95	INFORMATION SYSTEMS RESEARCH	7,491	2,457	6,069	0.008410
96	Management and Organization Review	1,515	2,400	3,270	0.001410
97	Review of Managerial Science	429	2,393	2,015	0.000500
98	Journal of Marketing Management	2,276	2,392	Not Available	0.002090
99	INTERNATIONAL JOURNAL OF ENTREPRENEURIAL BEHAVIOR & RESEARCH	1,628	2,391	Not Available	0.000780
100	Journal of Nursing Management	3,660	2,386	2,994	0.004220
101	Journal of Service Theory and Practice	347	2,363	2,485	0.000520
102	R & D MANAGEMENT	3,210	2,354	3,004	0.001530
103	International Transactions in Operational Research	1,488	2,341	2,284	0.001910

104	JOURNAL OF OCCUPATIONAL AND ORGANIZATIONAL PSYCHOLOGY	4,316	2,323	4,613	0.003320
105	International Journal of Retail & Distribution Management	2,619	2,321	Not Available	0.000980
106	Service Business	633	2,293	2,140	0.000580
107	GENDER WORK AND ORGANIZATION	1,881	2,273	2,741	0.001900
108	Information and Organization	674	2,269	3,441	0.000810
109	International Journal of Logistics Management	2,066	2,226	2,821	0.000780
110	MIS Quarterly Executive	559	2,206	2,718	0.000590
111	MIT SLOAN MANAGEMENT REVIEW	3,072	2,196	3,847	0.002690
111	SOCIO-ECONOMIC PLANNING SCIENCES	1,267	2,196	2,114	0.000730
113	TOTAL QUALITY MANAGEMENT & BUSINESS EXCELLENCE	3,257	2,181	2,224	0.001100
114	JOURNAL OF SPORT MANAGEMENT	1,809	2,167	2,691	0.001210
115	JOURNAL OF ENGINEERING AND TECHNOLOGY MANAGEMENT	1,278	2,159	3,291	0.000800
116	Eurasian Business Review	214	2,143	Not Available	0.000570
117	Sport Management Review	1,390	2,138	2,972	0.001540
118	Journal of Enterprise Information Management	1,101	2,126	Not Available	0.000730
119	International Journal of Emerging Markets	589	2,067	Not Available	0.000300
120	Research in Transportation Business and Management	676	2,065	Not Available	0.001300
121	Project Management Journal	1,779	2,043	3,102	0.001670
122	Journal of Product and Brand Management	2,278	2,018	Not Available	0.000970
123	Creativity and Innovation Management	1,396	2,015	2,866	0.001170
124	GROUP DECISION AND NEGOTIATION	1,245	2,010	2,030	0.001460
125	JOURNAL OF MANAGEMENT INQUIRY	1,496	1,986	2,058	0.001780
126	MANAGEMENT DECISION	4,550	1,963	2,330	0.002410
127	DECISION SCIENCES	4,038	1,960	2,799	0.001840
128	Electronic Commerce Research	586	1,940	2,536	0.000580
129	MANAGEMENT LEARNING	1,642	1,935	2,597	0.000930
129	TRANSPORTATION JOURNAL	602	1,935	1,413	0.000310
131	Nonprofit Management & Leadership	1,179	1,917	1,899	0.000700
132	Service Science	387	1,885	1,716	0.000590
133	Business Process Management Journal	1,825	1,880	Not Available	0.000730
134	IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT	2,850	1,867	2,268	0.001640
135	Journal of Brand Management	2,200	1,829	Not Available	0.000890
136	INDUSTRIAL AND CORPORATE CHANGE	3,912	1,824	2,580	0.002900
137	European Journal of Innovation Management	1,313	1,793	Not Available	0.000510
138	JOURNAL OF THE OPERATIONAL RESEARCH SOCIETY	7,621	1,754	1,921	0.004520
139	Sustainability Accounting Management and Policy Journal	367	1,745	Not Available	0.000350
140	TECHNOLOGY ANALYSIS & STRATEGIC MANAGEMENT	2,327	1,739	1,895	0.001510
141	JOURNAL OF APPLIED BEHAVIORAL SCIENCE	1,742	1,676	2,585	0.000830
142	Journal of Fashion Marketing and Management	1,127	1,645	Not Available	0.000380
143	Information Systems and E-Business Management	477	1,621	1,739	0.000440
144	European Management Review	709	1,600	2,588	0.000660
144	International Journal of Managing Projects in Business	610	1,600	Not Available	0.000640
146	International Journal of Strategic Property Management	435	1,597	1,477	0.000370
146	Journal of Leadership & Organizational Studies	1,408	1,597	2,485	0.001320
148	Science and Public Policy	2,048	1,575	2,051	0.002130
149	Career Development International	1,777	1,561	2,449	0.001410
149	Engineering Construction and Architectural Management	1,415	1,561	Not Available	0.000490
151	International Journal of Accounting Information Systems	619	1,548	1,907	0.000310
152	EMPLOYEE RELATIONS	1,125	1,496	1,903	0.000850
153	Knowledge Management Research & Practice	653	1,485	1,479	0.000420
154	Baltic Journal of Management	357	1,469	1,580	0.000190
155	LEADERSHIP & ORGANIZATION DEVELOPMENT JOURNAL	1,843	1,462	1,700	0.001030
156	SYSTEM DYNAMICS REVIEW	1,369	1,448	1,699	0.000260
157	Innovation-Organization & Management	538	1,429	1,513	0.000490
158	Journal of Managerial Psychology	3,120	1,415	2,186	0.002100

158	Scandinavian Journal of Management	1,527	1,415	2,550	0.001170
160	RESEARCH-TECHNOLOGY MANAGEMENT	1,191	1,407	2,970	0.000850
161	ORGANIZATIONAL DYNAMICS	2,476	1,397	1,604	0.000810
162	Journal of Contingencies and Crisis Management	988	1,365	1,880	0.000660
163	PERSONNEL REVIEW	2,024	1,362	2,030	0.001420
164	European Journal of International Management	386	1,349	1,164	0.000420
165	International Journal of Shipping and Transport Logistics	331	1,277	1,361	0.000490
166	Information Technology & Management	500	1,265	1,479	0.000350
167	Disaster Prevention and Management	1,105	1,247	1,483	0.000720
168	Leadership	739	1,246	2,197	0.000860
169	Amfiteatru Economic	452	1,238	0,890	0.000270
170	Asian Business & Management	282	1,231	1,300	0.000190
171	SMALL GROUP RESEARCH	1,776	1,222	1,914	0.001130
172	NEW TECHNOLOGY WORK AND EMPLOYMENT	495	1,219	2,375	0.000630
173	E & MEKonomics Management	391	1,211	1,015	0.000240
174	Gender in Management	591	1,206	Not Available	0.000440
175	Management Communication Quarterly	1,311	1,193	1,986	0.000980
176	Negotiation and Conflict Management Research	237	1,189	1,352	0.000440
177	Computational Economics	816	1,185	1,177	0.001150
177	JOURNAL OF ORGANIZATIONAL CHANGE MANAGEMENT	1,768	1,185	1,573	0.000800
179	AUSTRALIAN JOURNAL OF MANAGEMENT	697	1,183	1,600	0.000540
180	INTERNATIONAL JOURNAL OF TECHNOLOGY MANAGEMENT	1,631	1,160	1,799	0.000830
181	SERVICE INDUSTRIES JOURNAL	2,447	1,149	1,700	0.001050
182	IMA Journal of Management Mathematics	390	1,125	1,202	0.000520
183	ENGINEERING ECONOMIST	557	1,114	1,823	0.000290
184	Journal of Organizational and End User Computing	200	1,093	0,920	0.000160
185	JOURNAL OF ORGANIZATIONAL BEHAVIOR MANAGEMENT	424	1,091	1,138	0.000190
186	Managerial Auditing Journal	1,460	1,064	Not Available	0.000210
187	SYSTEMS RESEARCH AND BEHAVIORAL SCIENCE	1,032	1,052	1,375	0.001030
188	JOURNAL OF ECONOMICS & MANAGEMENT STRATEGY	1,899	1,025	1,719	0.002770
189	Journal of Management & Organization	728	1,021	1,173	0.000470
190	Decision Analysis	415	1,000	1,698	0.000760
191	Chinese Management Studies	347	0,936	1,034	0.000180
192	Asia Pacific Business Review	643	0,897	1,271	0.000320
193	Asia Pacific Journal of Human Resources	543	0,891	1,508	0.000510
194	INTERNATIONAL JOURNAL OF MANPOWER	1,485	0,882	1,181	0.001220
195	CANADIAN JOURNAL OF ADMINISTRATIVE SCIENCES- REVUE CANADIENNE DES SCIENCES DE L ADMINISTRATION	722	0,849	1,017	0.000290
196	INTERNATIONAL JOURNAL OF SELECTION AND ASSESSMENT	1,279	0,826	1,223	0.000890
197	Action Research	441	0,824	0,943	0.000260
198	JOURNAL OF FORECASTING	1,465	0,816	1,171	0.001450
199	German Journal of Human Resource Management- Zeitschrift für Personalforschung	26	0,759	0,759	0.000050
200	SYSTEMIC PRACTICE AND ACTION RESEARCH	514	0,754	1,000	0.000360
201	International Journal of Islamic and Middle Eastern Finance and Management	434	0,750	Not Available	0.000160
202	Advances in Strategic Management-A Research Annual	505	0,745	1,436	0.001220
203	INTERFACES	1,782	0,729	1,062	0.001000
204	REVIEW OF INDUSTRIAL ORGANIZATION	1,098	0,726	1,000	0.001370
205	MANAGERIAL AND DECISION ECONOMICS	1,346	0,701	Not Available	0.000890
205	RAE-Revista de Administração de Empresas	537	0,701	0,689	0.000160
207	Science Technology and Society	271	0,647	0,927	0.000280
208	Journal for East European Management Studies	146	0,571	0,742	0.000060
209	South African Journal of Economic and Management Sciences	311	0,551	0,649	0.000260
210	Culture and Organization	267	0,531	0,783	0.000290
211	Engineering Management Journal	441	0,524	0,870	0.000210
212	RBGN-Revista Brasileira de Gestão de Negócios	115	0,484	0,494	0.000050

213	Academia-Revista Latinoamericana de Administracion	165	0.474	0.724	0.000070
214	South African Journal of Business Management	229	0.429	0.465	0.000100
215	International Journal of Arts Management	260	0.361	0.788	0.000110
216	NEGOTIATION JOURNAL	455	0.214	0.593	0.000260
217	BETRIEBSWIRTSCHAFTLICHE FORSCHUNG UND PRAXIS	144	0.186	0.222	0.000050

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Journal Data Filtered By: Selected JCR Year: 2018 Selected Editions: SSCI Selected Categories: 'BUSINESS' Selected Category Scheme: WoS

Rank	Full Journal Title	Total Cites	Journal Impact Factor	5-Year Impact Factor	Eigenfactor Score
1	Academy of Management Annals	3,693	12.289	18.616	0.009790
2	ACADEMY OF MANAGEMENT REVIEW	35,903	10.632	14.170	0.011690
3	JOURNAL OF THE ACADEMY OF MARKETING SCIENCE	11,493	9.360	10.791	0.006170
4	JOURNAL OF MANAGEMENT	22,640	9.056	12.909	0.022860
5	ADMINISTRATIVE SCIENCE QUARTERLY	19,327	8.024	10.360	0.008750
6	JOURNAL OF MARKETING	24,994	7.821	8.829	0.008270
7	JOURNAL OF INTERNATIONAL BUSINESS STUDIES	15,419	7.724	9.713	0.008020
8	INTERNATIONAL JOURNAL OF MANAGEMENT REVIEWS	4,174	7.600	10.017	0.003700
9	ACADEMY OF MANAGEMENT JOURNAL	39,363	7.191	11.891	0.029750
10	Business Strategy and the Environment	5,266	6.381	7.557	0.002200
11	JOURNAL OF BUSINESS VENTURING	12,076	6.333	10.790	0.007920
12	ENTREPRENEURSHIP THEORY AND PRACTICE	10,948	6.193	9.547	0.008540
13	Family Business Review	3,374	6.188	7.071	0.001700
14	JOURNAL OF MANAGEMENT STUDIES	11,622	5.839	7.924	0.008730
15	JOURNAL OF WORLD BUSINESS	5,206	5.789	6.078	0.004820
16	HARVARD BUSINESS REVIEW	18,160	5.691	6.132	0.013090
17	STRATEGIC MANAGEMENT JOURNAL	34,978	5.572	8.356	0.027150
18	Corporate Social Responsibility and Environmental Management	2,809	5.513	7.131	0.001220
19	Business & Society	2,837	5.013	4.717	0.001900
20	CALIFORNIA MANAGEMENT REVIEW	5,667	5.000	5.331	0.002260
20	JOURNAL OF ORGANIZATIONAL BEHAVIOR	12,028	5.000	6.533	0.010240
22	INDUSTRIAL MARKETING MANAGEMENT	9,758	4.779	5.088	0.006010
23	JOURNAL OF CONSUMER RESEARCH	20,065	4.701	6.467	0.011900
24	JOURNAL OF INTERACTIVE MARKETING	3,450	4.691	7.453	0.002380
25	SUPPLY CHAIN MANAGEMENT-AN INTERNATIONAL JOURNAL	5,566	4.296	7.462	0.003030
26	JOURNAL OF MARKETING RESEARCH	20,463	4.200	6.007	0.011660
27	JOURNAL OF ENVIRONMENTAL ECONOMICS AND MANAGEMENT	6,354	4.175	4.556	0.006370
28	Internet Research	2,395	4.109	4.835	0.001720
29	JOURNAL OF SERVICE RESEARCH	4,513	4.071	7.067	0.003050
30	JOURNAL OF BUSINESS RESEARCH	23,613	4.028	4.747	0.021330
31	Academy of Management Perspectives	2,954	3.857	8.932	0.004770
32	TECHNOLOGICAL FORECASTING AND SOCIAL CHANGE	10,332	3.815	4.040	0.012320
33	JOURNAL OF BUSINESS ETHICS	28,253	3.796	4.980	0.017780
34	JOURNAL OF PRODUCT INNOVATION MANAGEMENT	6,596	3.781	5.824	0.005660
35	Journal of Intellectual Capital	2,591	3.744	Not Available	0.000520
36	International Small Business Journal-Researching Entrepreneurship	2,961	3.706	4.946	0.002580
37	JOURNAL OF RETAILING	7,649	3.671	6.254	0.003650
38	International Business Review	4,879	3.639	4.030	0.003820
39	Journal of Retailing and Consumer Services	4,313	3.585	Not Available	0.003670
40	Marketing Theory	1,882	3.577	4.159	0.001520
41	SMALL BUSINESS ECONOMICS	7,096	3.555	4.452	0.006470
42	Electronic Markets	874	3.553	3.487	0.000880

43	JOURNAL OF ADVERTISING	4,143	3,518	4,279	0.002410
44	INTERNATIONAL MARKETING REVIEW	2,667	3,447	3,833	0.001320
45	INTERNATIONAL JOURNAL OF ELECTRONIC COMMERCE	2,073	3,439	4,733	0.000930
46	CORPORATE GOVERNANCE-AN INTERNATIONAL REVIEW	3,289	3,390	4,408	0.001780
47	JOURNAL OF INTERNATIONAL MARKETING	2,066	3,375	5,030	0.001170
48	LONG RANGE PLANNING	4,841	3,363	5,404	0.002740
49	INTERNATIONAL JOURNAL OF RESEARCH IN MARKETING	3,964	3,320	3,177	0.003770
50	BRQ-Business Research Quarterly	255	3,250	3,125	0.000280
51	Journal of Family Business Strategy	795	3,225	4,229	0.001200
52	Strategic Organization	1,359	3,109	4,550	0.002240
53	Journal of Hospitality Marketing & Management	1,308	3,011	Not Available	0.001090
54	European Management Journal	3,775	2,985	3,606	0.002660
55	Strategic Entrepreneurship Journal	1,770	2,956	5,410	0.001990
56	ENTREPRENEURSHIP AND REGIONAL DEVELOPMENT	2,913	2,928	4,578	0.001750
57	Business Ethics-A European Review	1,540	2,919	3,423	0.000960
58	Electronic Commerce Research and Applications	2,110	2,911	3,661	0.001940
59	BUSINESS HORIZONS	4,639	2,828	3,436	0.002310
60	BUSINESS ETHICS QUARTERLY	2,266	2,788	4,529	0.001370
61	BRITISH JOURNAL OF MANAGEMENT	4,496	2,750	4,619	0.003500
62	JOURNAL OF BUSINESS AND PSYCHOLOGY	3,003	2,582	3,995	0.004050
63	International Entrepreneurship and Management Journal	1,311	2,537	2,916	0.001130
64	MARKETING SCIENCE	6,826	2,490	3,598	0.008040
65	JOURNAL OF CONSUMER PSYCHOLOGY	4,822	2,466	4,000	0.005980
66	JOURNAL OF PUBLIC POLICY & MARKETING	1,785	2,457	2,460	0.001200
67	Journal of Services Marketing	3,562	2,421	3,194	0.001610
68	Journal of Marketing Management	2,276	2,392	Not Available	0.002090
69	INTERNATIONAL JOURNAL OF ENTREPRENEURIAL BEHAVIOR & RESEARCH	1,628	2,391	Not Available	0.000780
70	Journal of Service Theory and Practice	347	2,363	2,485	0.000520
71	R & D MANAGEMENT	3,210	2,354	3,004	0.001530
72	International Journal of Retail & Distribution Management	2,619	2,321	Not Available	0.000980
73	Service Business	633	2,293	2,140	0.000580
74	International Journal of Advertising	1,653	2,234	2,807	0.001410
75	International Journal of Bank Marketing	1,945	2,196	Not Available	0.000540
75	MIT SLOAN MANAGEMENT REVIEW	3,072	2,196	3,847	0.002690
77	JOURNAL OF ENGINEERING AND TECHNOLOGY MANAGEMENT	1,278	2,159	3,291	0.000800
78	Journal of Research in Interactive Marketing	429	2,156	Not Available	0.000330
79	Eurasian Business Review	214	2,143	Not Available	0.000570
80	JOURNAL OF ADVERTISING RESEARCH	2,741	2,100	2,400	0.001130
81	International Journal of Emerging Markets	589	2,067	Not Available	0.000300
82	Research in Transportation Business and Management	676	2,065	Not Available	0.001300
83	JOURNAL OF CONSUMER AFFAIRS	1,514	2,038	2,056	0.000760
84	Journal of Product and Brand Management	2,278	2,018	Not Available	0.000970
85	MANAGEMENT DECISION	4,550	1,963	2,330	0.002410
86	JOURNAL OF BUSINESS & INDUSTRIAL MARKETING	2,335	1,961	2,256	0.001320
87	Consumption Markets & Culture	870	1,951	2,458	0.001010
88	Electronic Commerce Research	586	1,940	2,536	0.000580
89	Service Science	387	1,885	1,716	0.000590
90	PSYCHOLOGY & MARKETING	5,367	1,882	3,076	0.003550
91	Business Process Management Journal	1,825	1,880	Not Available	0.000730

92	IEEE TRANSACTIONS ON ENGINEERING MANAGEMENT	2,850	1,867	2,268	0.001640
93	Journal of Vacation Marketing	1,425	1,865	Not Available	0.000570
94	Journal of Business Economics and Management	892	1,855	1,569	0.000830
95	Journal of Brand Management	2,200	1,829	Not Available	0.000890
96	INDUSTRIAL AND CORPORATE CHANGE	3,912	1,824	2,580	0.002900
97	European Journal of Innovation Management	1,313	1,793	Not Available	0.000510
98	Journal of Electronic Commerce Research	831	1,786	2,807	0.000610
99	EUROPEAN JOURNAL OF MARKETING	7,137	1,716	2,549	0.002800
100	Journal of Fashion Marketing and Management	1,127	1,645	Not Available	0.000380
101	Entrepreneurship Research Journal	201	1,625	2,319	0.000280
102	MARKETING LETTERS	2,245	1,624	2,271	0.001980
103	Information Systems and E-Business Management	477	1,621	1,739	0.000440
104	PUBLIC RELATIONS REVIEW	3,512	1,616	2,013	0.002290
105	JOURNAL OF PRODUCTIVITY ANALYSIS	2,400	1,603	1,991	0.002080
106	International Journal of Managing Projects in Business	610	1,600	Not Available	0.000640
107	Marketing Intelligence & Planning	1,772	1,585	Not Available	0.000630
108	Journal of Consumer Behaviour	1,979	1,580	2,324	0.001510
109	International Journal of Accounting Information Systems	619	1,548	1,907	0.000310
109	Journal of Social Marketing	250	1,548	Not Available	0.000200
111	Journal of Macromarketing	1,133	1,517	2,368	0.000790
112	International Journal of Consumer Studies	2,555	1,506	2,253	0.002040
113	Multinational Business Review	364	1,436	Not Available	0.000430
114	RESEARCH-TECHNOLOGY MANAGEMENT	1,191	1,407	2,970	0.000850
115	ORGANIZATIONAL DYNAMICS	2,476	1,397	1,604	0.000810
116	International Journal of Business Communication	100	1,293	Not Available	0.000260
117	Asia Pacific Journal of Marketing and Logistics	944	1,276	Not Available	0.000440
118	BUSINESS HISTORY REVIEW	685	1,270	1,381	0.000880
119	Amfiteatru Economic	452	1,238	0,890	0.000270
120	Asian Business & Management	282	1,231	1,300	0.000190
121	Gender in Management	591	1,206	Not Available	0.000440
122	AUSTRALIAN JOURNAL OF MANAGEMENT	697	1,183	1,600	0.000540
123	BUSINESS HISTORY	935	1,152	1,406	0.001490
124	Sport Marketing Quarterly	635	1,143	Not Available	0.000210
125	ENGINEERING ECONOMIST	557	1,114	1,823	0.000290
126	Transformations in Business & Economics	410	1,058	0,705	0.000300
127	Journal of Business-to-Business Marketing	328	0,941	1,253	0.000200
128	EMERGING MARKETS FINANCE AND TRADE	1,014	0,934	0,891	0.001570
129	JOURNAL OF BUSINESS AND TECHNICAL COMMUNICATION	369	0,900	1,468	0.000400
130	Asia Pacific Business Review	643	0,897	1,271	0.000320
130	Clothing and Textiles Research Journal	644	0,897	1,192	0.000150
132	QME-Quantitative Marketing and Economics	499	0,864	1,650	0.001540
133	CANADIAN JOURNAL OF ADMINISTRATIVE SCIENCES-REVUE CANADIENNE DES SCIENCES DE L ADMINISTRATION	722	0,849	1,017	0.000290
134	Journal of Theoretical and Applied Electronic Commerce Research	304	0,833	Not Available	0.000250
135	AMERICAN BUSINESS LAW JOURNAL	263	0,786	0,893	0.000130
136	INTERNATIONAL JOURNAL OF MARKET RESEARCH	912	0,726	1,175	0.000470
137	Asian Journal of Technology Innovation	192	0,706	0,823	0.000210
138	RAE-Revista de Administracao de Empresas	537	0,701	0,689	0.000160
139	European Business Organization Law Review	202	0,673	1,009	0.000320
140	Revista de Historia Industrial	206	0,617	0,595	0.000280

141	ENTERPRISE & SOCIETY	302	0.577	0.854	0.000750
142	Journal of World Energy Law & Business	116	0.516	0.489	0.000160
143	RBGN-Revista Brasileira de Gestao de Negocios	115	0.484	0.494	0.000050
144	Academia-Revista Latinoamericana de Administracion	165	0.474	0.724	0.000070
145	South African Journal of Business Management	229	0.429	0.465	0.000100
146	Custos e Agronegocio On Line	197	0.390	0.426	0.000120
147	BETRIEBSWIRTSCHAFTLICHE FORSCHUNG UND PRAXIS	144	0.186	0.222	0.000050

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Table 7: Focus Publications

Author	Title	Journal	Publication Date	Publication Year	DOI
Alcacer, J.; Cantwell, J.; Piscitello, L.	Internationalization in the information age: A new era for places, firms, and international business networks?	J. Int. Bus. Stud.	JUN-JUL	2016	10.1057/jibs.2016.22
Alcantara-Pilar, JM; Del Barrio-Garcia, S; Rodriguez-Lopez, ME	Does language matter? A cross-national comparison of the moderating effect of language on website information-processing	JOURNAL OF BUSINESS RESEARCH		2018	
Alkharaji, A; Liu, SF; Odeant, FO; Magicks, P	New structured knowledge network for strategic decision-making in IT innovative and implementable projects	JOURNAL OF BUSINESS RESEARCH		2016	
Allen, L; Chakraborty, S; Haazrika, S; Su, CH	Bank dependence in emerging countries: Cross-border information percolation in mutual fund equity investing	J. Int. Bus. Stud.	MAR	2020	10.1057/j41267-019-00273-1
Bae, KH; Purda, L; Welker, M; Zhong, LG	Credit rating initiation and accounting quality for emerging-market firms	J. Int. Bus. Stud.	APR	2013	10.1057/jibs.2013.4
Balk, B; Kang, JK; Kim, JM; Lee, J	The liability of foreignness in international equity investments: Evidence from the US stock market	J. Int. Bus. Stud.	MAY	2013	10.1057/jibs.2013.13
Banaleva, BI; Dhanraj, C	Internationalization theory for the digital economy	J. Int. Bus. Stud.	OCT	2019	10.1057/j41267-019-00243-7
Bell, RG; Filatotchev, I; Rasheed, AA	The liability of foreignness in capital markets: Sources and remedies	J. Int. Bus. Stud.	FEB-MAR	2012	10.1057/jibs.2011.55
Berry, H	Leaders, laggards, and the pursuit of foreign knowledge	Strateg. Manage. J.	FEB	2006	10.1002/smj.509
Bhaurmik, SK; Owolabi, O; Pal, S	Private information, institutional distance, and the failure of cross-border acquisitions: Evidence from the banking sector in Central and Eastern Europe	JOURNAL OF WORLD BUSINESS		2018	
Boeth, KK	Contracting Costs and Information Asymmetry Reduction in Cross-Border M&A	J. Manage. Stud.	MAY	2011	10.1111/j.1467-6486.2010.00938.x
Boellis, A; Mariotti, S; Minichilli, A; Piscitello, L	Family involvement and firms' establishment mode choice in foreign markets	J. Int. Bus. Stud.	OCT-NOV	2016	10.1057/jibs.2016.23
Boone, C; Van Offien, W; Van Witteloostuijn, A	Team focus-of-control composition, leadership structure, information acquisition, and financial performance: A business simulation study	Acad. Manage. J.	OCT	2005	10.5465/AMJ.2005.18803929
Brouthers, KD; Grieser, KD; Rothlauf, F	Explaining the internationalization of business firms	J. Int. Bus. Stud.	JUN-JUL	2016	10.1057/jibs.2015.20
Buckley, PJ; Huihui, N	A global system view of firm boundaries	J. Int. Bus. Stud.	JAN	2004	10.1057/palgrave.jibs.8400059
Cannizzaro, AP; Weiner, RJ	State ownership and transparency in foreign direct investment	J. Int. Bus. Stud.	FEB	2018	10.1057/j41267-017-0117-5
Chen, CJP; Ding, YA; Kim, C	High-level politically connected firms, corruption, and analyst forecast accuracy around the world	J. Int. Bus. Stud.	DEC	2010	10.1057/jibs.2010.27
Chen, I; Shaheer, N; Yi, JT; Li, SL	The international generation of business firms: Network effects, liabilities of outsiderhip and country cloud	J. Int. Bus. Stud.	MAR	2019	10.1057/j41267-018-0176-2
Coviello, N; Kano, L; Liesch, PW	Adapting the Uppsala model to a modern world: Macro-context and microfoundations	J. Int. Bus. Stud.	DEC	2017	10.1057/j41267-017-0120-x
Dawar, N; Parker, PM; Price, LJ	A cross-cultural study of interpersonal information exchange	J. Int. Bus. Stud.		1996	10.1057/palgrave.jibs.8490142
DiMaggio, PJ; Das, J; Corti, KT; Burbridge, J	Corruption and the role of information	J. Int. Bus. Stud.	MAR	2007	10.1057/palgrave.jibs.8400262
Dow, D; Coopers, IRP; Ertug, G	The effects of within-country linguistic and religious diversity on foreign acquisitions	J. Int. Bus. Stud.	APR	2016	10.1057/jibs.2016.7
Duammi, JL	State-owned MNCs and host country expropriation risk: The role of home state soft power and economic gunboat diplomacy	J. Int. Bus. Stud.	OCT-NOV	2014	10.1057/jibs.2014.16
Espan, A	Social structure and technology spillovers from foreign to domestic firms	J. Int. Bus. Stud.	APR	2012	10.1057/jibs.2012.2
Eden, L; Rodriguez, P	How weak are the signals? International price indices and multinational enterprises	J. Int. Bus. Stud.	JAN	2004	10.1057/palgrave.jibs.8400069
El Ghoul, S; Guedhami, O; Kwok, CCY; Zheng, Y	The role of creditor rights on capital structure and product market interactions: International evidence	J. Int. Bus. Stud.			10.1057/j41267-020-00309-x
Eurumban, AA; de Jong, SB	Cross-country differences in ICT adoption: A consequence of Culture?	JOURNAL OF WORLD BUSINESS		2006	
George, JM; Jones, GR; Gonzalez, JA	The role of affect in cross-cultural negotiations	J. Int. Bus. Stud.		1998	10.1057/palgrave.jibs.8490051
HITT, MA; HOSKISSON, RE; IRELAND, RD	A MIDRANGE THEORY OF THE INTERACTIVE EFFECTS OF INTERNATIONAL AND PRODUCT DIVERSIFICATION AND PRODUCT DIVERSIFICATION ON INNOVATION AND PERFORMANCE	J. Manage.	SUM	1994	10.1016/0149-2063(94)90018-3
Hope, OK; Thomas, W; Vyas, D	Financial credibility, ownership, and financing constraints in private firms	J. Int. Bus. Stud.	SEP	2011	10.1057/jibs.2011.23
Huang, Z; Zhu, H; Brass, DJ	CROSS-BORDER ACQUISITIONS AND THE ASYMMETRIC EFFECT OF POWER DISTANCE VALUE DIFFERENCE ON LONG-TERM POST-ACQUISITION PERFORMANCE	Strateg. Manage. J.	APR	2017	10.1002/smj.2530
Humphrey-Jenner, M; Sautner, Z; Suchard, JA	CROSS-BORDER MERGERS AND ACQUISITIONS: THE ROLE OF PRIVATE EQUITY FIRMS	Strateg. Manage. J.	AUG	2017	10.1002/smj.2623
Iurkov, V; Benito, GRG	Domestic alliance networks and regional strategies of MNEs: A structural embeddedness perspective	J. Int. Bus. Stud.	OCT	2018	10.1057/j41267-017-0089-5
Jandhyala, S	Property rights and international investment in information technology services	Strateg. Manage. J.	JUL	2013	10.1002/smj.2032
Jandik, T; Kali, R	Legal systems, information asymmetry, and firm boundaries: Cross-border choices to diversify through mergers, joint ventures, or strategic alliances	J. Int. Bus. Stud.	MAY	2009	10.1057/jibs.2008.55
Jean, RJ; Kim, D; Cavigli, E	Antecedents and outcomes of digital platform risk for international new ventures' internationalization	JOURNAL OF WORLD BUSINESS		2020	
Jensen, NM; Li, QA; Rahman, A	Understanding corruption and firm responses in cross-national firm-level surveys	J. Int. Bus. Stud.	DEC	2010	10.1057/jibs.2010.8
Kang, JK; Kim, JM	Do foreign investors exhibit a corporate governance disadvantage? An information asymmetry perspective	J. Int. Bus. Stud.	OCT-NOV	2010	10.1057/jibs.2010.18
Ke, DM; Ng, L; Wang, QH	Home bias in foreign investment decisions	J. Int. Bus. Stud.	AUG	2010	10.1057/jibs.2009.48
Khalid, S; Bhatti, K	Entrepreneurial competence in managing partnerships and partnership knowledge exchange: Impact on performance differences in export expansion stages	JOURNAL OF WORLD BUSINESS		2015	
Krishnan, AS; Beresan, O; Agarwal, S; Kachroo, P	Social media networking satisfaction in the US and Vietnam: Content versus connection	JOURNAL OF BUSINESS RESEARCH		2019	
Kulchina, E	Media coverage and location choice	Strateg. Manage. J.	APR	2014	10.1002/smj.2106
Lederman, D	An international multilevel analysis of product innovation	J. Int. Bus. Stud.	MAY	2010	10.1057/jibs.2009.30
Lee, MT; Raschke, RL; St Louis, R	Exploiting organizational culture: Configurations for value through knowledge worker's motivation	JOURNAL OF BUSINESS RESEARCH		2016	
Lew, YK; Sinkovics, RR; Mo, YM; Khan, Z	Trans-specialization understanding in international technology alliances: The influence of cultural distance	J. Int. Bus. Stud.	JUN-JUL	2016	10.1057/jibs.2016.10
Li, Y; Hernandez, E; Gwon, S	WHEN DO ETHNIC COMMUNITIES AFFECT FOREIGN LOCATION CHOICE? DUAL ENTRY STRATEGIES OF KOREAN BANKS IN CHINA	Acad. Manage. J.	FEB	2019	10.5465/amj.2017.0275
Liu, LA; Adair, WL; Bello, DC	Fit, misfit, and beyond fit: Relational metaphors and semantic fit in international joint ventures	J. Int. Bus. Stud.	SEP	2015	10.1057/jibs.2015.13
Luo, YD; Bu, J	How valuable is information and communication technology? A study of emerging economy enterprises	JOURNAL OF WORLD BUSINESS		2016	
Luo, YD; Wang, SL; Zheng, QQ; Jayaraman, V	Task attributes and process integration in business process offshoring: A perspective of service providers from India and China	J. Int. Bus. Stud.	JUN-JUL	2012	10.1057/jibs.2012.8
Ly, A; Esperanza, J; Davcik, NS	What drives foreign direct investment: The role of language, geographical distance, information flows and technological similarity	JOURNAL OF BUSINESS RESEARCH		2018	
Maitland, E; Sammartino, A	Managerial cognition and internationalization	J. Int. Bus. Stud.	SEP	2015	10.1057/jibs.2015.9
Mahotra, S; Gaur, AS	Spatial geography and control in foreign acquisitions	J. Int. Bus. Stud.	FEB-MAR	2014	10.1057/jibs.2013.50
Mariotti, S; Piscitello, L	Information costs and location of FDI within the host country: Empirical evidence from Italy	J. Int. Bus. Stud.		1995	10.1057/palgrave.jibs.8490821
McCann, BT; Reuer, JJ; Lahriri, N	Agglomeration and the choice between acquisitions and alliances: An information economics perspective	Strateg. Manage. J.	JUN	2016	10.1002/smj.2387
McGahan, AM; Victor, R	How much does home country matter to corporate profitability?	J. Int. Bus. Stud.	JAN	2010	10.1057/jibs.2009.69
Monaghan, S; Tippmann, E; Coviello, N	Born digitals: Thoughts on their internationalization and a research agenda	J. Int. Bus. Stud.	FEB	2020	10.1057/j41267-019-00290-0
Morck, R; Yeung, B	History in perspective: comment on Jones and Khanna "Bringing history (back) into international business"	J. Int. Bus. Stud.	MAR	2007	10.1057/palgrave.jibs.8400258
Nachum, L; Zaher, S	The persistence of distance? The impact of technology on MNE motivations for foreign investment	Strateg. Manage. J.	AUG	2005	10.1002/smj.472
Nieto, MI; Rodriguez, A	Offshoring of R&D: Looking abroad to improve innovation performance	J. Int. Bus. Stud.	APR	2011	10.1057/jibs.2010.59
Oehme, M; Bort, S	SME internationalization modes in the German biotechnology industry: The influence of imitation, network position, and international experience	J. Int. Bus. Stud.	AUG	2015	10.1057/jibs.2015.8
Ojala, A; Evers, N; Riialp, A	Extending the international new venture phenomenon to digital platform providers: A longitudinal case study	JOURNAL OF WORLD BUSINESS		2018	
Pozebon, M; van Heck, E	Local adaptations of generic application systems: the case of Velling Holambra in Brazil	J. Inf. Technol.	JUN	2006	10.1057/palgrave.jit.2000059
Rabbiosi, L; Santangelo, GD	Host country corruption and the organization of HQ-subsidiary relationships	J. Int. Bus. Stud.	FEB	2019	10.1057/j41267-018-0169-1
Rangan, S; Sengul, M	Information technology and transnational integration: Theory and evidence on the evolution of the modern multinational enterprise	J. Int. Bus. Stud.	DEC	2009	10.1057/jibs.2009.55
Reuer, JJ; Tong, TW; Wu, CW	A SIGNALING THEORY OF ACQUISITION PREMIUMS: EVIDENCE FROM IPO TARGETS	Acad. Manage. J.	JUN	2012	10.5465/amj.2010.0259
Sanders, WG; Carpenter, MA	Internationalization and firm governance: The roles of CEO compensation, top team composition, and board structure	Acad. Manage. J.	APR	1998	10.2307/257100
Santangelo, GD; Meyer, KE	Extending the internationalization process model: Increases and decreases of MNE commitment in emerging economies	J. Int. Bus. Stud.	SEP	2011	10.1057/jibs.2011.25
Shao, LA; Kwok, CCY; Guedhami, O	National culture and dividend policy	J. Int. Bus. Stud.	OCT-NOV	2010	10.1057/jibs.2009.74
Shaver, JM; Mitchell, W; Yeung, B	The effect of own-firm and other-firm experience on foreign direct investment survival in the United States, 1987-92	Strateg. Manage. J.	NOV	1997	10.1002/[SICI]1097-0266(199711)18:10<811::AID-SMJ924>3.0.CO;2-8
Shi, YQ; Maignan, M; Kim, JB	Do countries matter for voluntary disclosure? Evidence from cross-listed firms in the US	J. Int. Bus. Stud.	FEB-MAR	2012	10.1057/jibs.2011.38
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Part III

Internationalization in the Digital Age: The Role Of Cultural Distance And Industry Dynamism

Abstract

This study examines the impact of information and communication technologies (ICT) on the degree of internationalization by focusing on multinational enterprises (MNEs). We argue that ICT helps MNEs to reduce internal and external transaction costs in an international context, resulting in a higher degree of internationalization. We further argue that the positive impact becomes more pronounced under the condition of high cultural distance and a high level of industry dynamism.

Our empirical results are strongly congruent with our hypotheses. We used a panel dataset from four major European countries, consisting of 567 firm year observations from 2011, 2013, and 2015. Overall, our study contributes to the emerging research stream about internationalization in the digital age. It shows that ICT acts as a filter for uncertainty, both ex-post and ex-ante, in the internationalization process.³

Keywords: Degree of Internationalization; ICT; Cultural Distance

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1 Introduction

Over the last three decades, digital innovations, especially the development of information and communication technologies (ICT), have reshaped the global landscape in which MNEs operate (Brouthers, Geisser, and Rothlauf, 2016; Chen and Kamal, 2016; Hazlehurst and Brouthers, 2018). MNEs, in particular, can benefit from digital innovations that reduce transaction costs, including communication, coordination, market research, transportation, and monitoring in the internationalization process (Ray, Xue, and Barney, 2013). Ultimately, such digital innovations impact firms' ability to reconfigure international resources and influence their international business strategy (Coviello, Kano, and Liesch, 2017).

Transaction cost theory has been the leading perspective in international business research to answer the question about whether to conduct business abroad (Buckley and Casson, 1976; Buckley, 1988; Rugman and Verbeke, 2005; Chen and Kamal, 2016). The general rationale of internalization theory is that firms exploit their firm specific advantages (FSA) across borders in order to capture or generate value from imperfect markets until the associated costs outperform the benefits (Buckley, 1988; Kirca, Hult, Roth, Cavusgil, Perry, Akdeniz, Deligonul, Mena, Pollitte, Hoppner, Miller, and White, 2011; Buckley, 2016). Recent literature suggests that ICT helps firms to reduce transaction costs and that ICT modifies the internationalization process in terms of timing, location, rhythm, and entry mode choices (Coviello et al., 2017). Rangan and Sengul (2009) studied the impact of ICT deployment on transnational integration and provided empirical evidence that internationalization and internalization are coupled less than they were before the digital era. In contrast, Banalieva and Dhanaraj (2019) examined the effect of digitalization on internalization theory's assumptions about the nature of FSAs and concluded that the concept of place is shifting from physical assets to digital information exchange. According to Banalieva and Dhanaraj (2019), new digital technologies enable MNEs to enter foreign markets through digital networks at significantly lower transaction costs and with less or no physical assets. Our study complements studies in the field of international business strategy by examining how ICT impacts internationalization, measured as the proportion of foreign sales to total sales, on the firm level.

While research on the impact of ICT has become increasingly important in marketing and information system research, international business scholars have only begun to explore the impact of ICT (Drnevich and Croson, 2013; Alcácer, Cantwell, and Piscitello, 2016; Coviello et al., 2017; Hazlehurst and Brouthers, 2018). Despite existing research in information technology, digital business strategy (Bharadwaj, 2000; Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013; Drnevich and Croson, 2013), IT implementation and usage (Devaraj and Kohli, 2003), production process (Laplume, 2018), Global Value Chain (GVC) (Gooris and Peeters, 2015), communication and firm organization (Bloom, Garicano, Sadun, and Van Reenen, 2014), or firm profitability (Mithas, Tafti, Bardhan, and Goh, 2012), two key questions remain unanswered: "How does ICT influence the degree of internationalization? And under which conditions can MNEs benefit from ICT usage?"

Despite public awareness, commercial interest, and over 30 years of academic research in international business, the link between ICT and the scope of internationalization has still not been established (with exception to Mithas, Whitaker, and Tafti (2017)). This research gap results partly from the disconnect between the IT business value literature and the strategic management literature. On the one hand, the IT business value literature demonstrates that ICT can play several roles, which

substantially improve firm performance (for a detailed discussion, see Drnevich and Croson (2013). On the other hand, the IB and strategy literature is falling behind other areas, such as marketing and information systems, by neglecting the impact of ICT (Hazlehurst and Brouthers, 2018).

Correspondingly, the main purpose of this study is to extend understanding of internationalization in the digital age. We follow earlier scholars' attempts to link these two disconnected research streams. By testing the impact of ICT on firms' degree of internationalization, we respond to calls for further research at digital-international interface (Chen and Kamal, 2016; Vahlne and Johanson, 2017; Coviello et al., 2017; Hazlehurst and Brouthers, 2018).

Our central argument is that ICT reduces uncertainty and creates more transparency, ex-post and ex-ante, in the internationalization process. Such advantages will help the firm to overcome transaction-cost challenges in the process of international expansion — thereby increasing the firm's scope of internationalization. We also suggest that this relationship will become more pronounced under conditions of cultural distance and industry dynamism. Under such conditions, the advantage results from increased transparency over foreign internal and external activities. This, in turn, enhances the firm's standing in a dynamic market environment. To this end, we highlight the key role of ICT in a firm's international strategic posture — by stressing that external uncertainty drivers can strengthen the advantage of ICT for MNEs.

Our study contributes to the international business literature in three distinct ways. First, our key finding concerns the effect of ICT on the degree of internationalization. Here, we contribute to the ongoing discussion about the role of internationalization in the digital age by demonstrating that ICT fosters international business and impacts firms' international business position. Second, by drawing on transaction cost theory, we shed new light on the role of ICT in the internationalization process of MNEs by considering cultural and industry conditions as moderating forces that have been central in prior international business research. Third, we help to theoretically integrate ICT into international business theories and research by outlining its impact on the reduction of internal and external uncertainty in international business.

2 Theory and Hypotheses

Rooted in the framework of markets and hierarchies (Hymer, 1960; Williamson, 1975), internalization theory offers a theoretical basis for understanding why MNEs exist, and why organizations expand beyond national borders. In this regard, internationalization theory suggests that firms exploit their FSAs across borders in order to capture or generate value from imperfect markets (Buckley, 1988; Buckley and Casson, 2009). According to internationalization theory, “an MNE is created when a firm can increase its value by internalizing markets for certain of its intangible assets across national borders” (Kirca et al., 2011, p.48).

Buckley (1988) highlighted the key role of asset specificity in the internationalization process of MNEs. He Buckley (1988) suggested that the transferability of an asset strongly impacts transaction costs and ultimately the degree of internationalization. Kim, Hoskisson, and Lee (2015) distinguished internal and external transaction costs. Transaction costs are expected to vary from country to country due to geographical, institutional, or cultural differences. Internal coordination costs are the economic costs needed to manage dependencies between activities within the firm (e.g., data

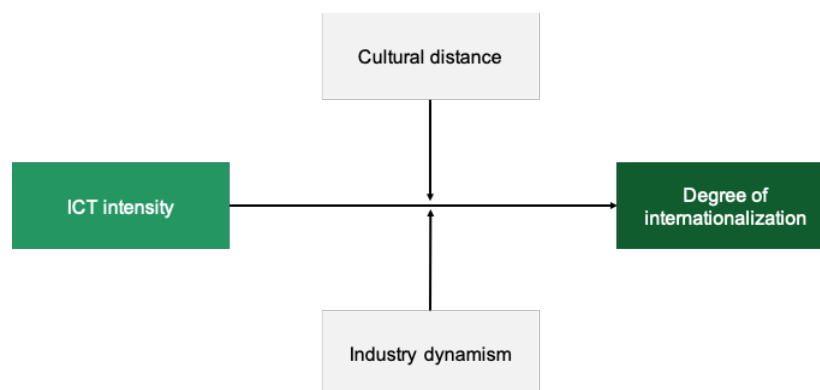
transfer, communication, or knowledge exchange within teams). External coordination costs are economic costs that arise from activities with external parties. Examples include the enforceability of contracts with external suppliers, monitoring costs, locating suppliers in a foreign country, and other economic costs of market procurement (Chen and Kamal, 2016).

International business research has shown that knowledge and superior information about foreign markets help to safeguard problems in the internationalization process (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017). Firms with more information about foreign markets are expected to attain a higher degree of internationalization at lower costs than their counterparts. This effect results from better understanding different cultures (Monaghan and Tippmann, 2018), from international experience (Vahlne and Johanson, 2017), or from international business networks (Verbeke, Coeurderoy, and Matt, 2018). While international business research has made important contributions to understanding internal and external transaction cost drivers and the resulting effect on the degree of internationalization, little is known about how ICT impacts internationalization. Furthermore, little research has been conducted on the interface between established transaction cost drivers, such as cultural distance and industry dynamism, and ICT.

We follow international business scholars and assume that knowledge and information about foreign markets reduce transaction costs and subsequently influence the degree of internationalization. Recent research by Banalieva and Dhanaraj (2019) has illumined the central role of asset specificity and FSA in internationalization. The authors suggest that ICT is becoming increasingly important for MNEs' international business strategy.

Our research extends this research by showing that ICT can deliver important information that increases transparency in the internationalization process. As a result, transaction costs decrease both internally and externally. Drawing on transaction cost theory, our research model proposes that ICT positively impacts the firm's degree of internationalization. To help better understand the degree of internationalization, we assume that the environmental conditions in which a firm operates — cultural distance and industry dynamism — strengthen the positive effect of ICT on DOI. Our conceptual model illustrates this linkage (Figure 5).

Figure 5: **Conceptual Model**



2.1 Cause and effect between ICT intensity and internationalization

The phenomena is complex as many questions in strategy and international business research⁴. The complexity in the proposed relationship, from ICT to the degree of internationalization, results from the interdependence of cause and effect. On the one hand, international business scholars are interested in examining the effect of how investments in ICT influence the international posture of a firm. On the other hand, MIS research is interested in the cause of ICT investments in internationalized firms. The challenge is to unlock the obvious intertwined relationship between cause and effect⁵. We following prior strategy and international business research, such as Alcácer et al. (2016); Arora et al. (2016); Banalieva and Dhanaraj (2019) by addressing this complexity. We aim to uncover a partial answer in this intertwined relationship by focusing on the impact of ICT intensity on the degree of internationalization. To unlock the proposed relationship we focusing on three main topics.

First, from a theoretical lens, MIS research explains why and under what conditions ICT capabilities capture or create value in business process. Early research in the field of IT business value noted that "Once acquired, ICT does for free what intermediaries do for a fee" (Cordelia, 2006, p. 199). The majority of early MIS literature emphasized the transaction cost elements in the business value of ICT (Drnevich and Croson, 2013). Assuming that firms invest in ICT to reduce cost on project or process level, we propose that the resulting benefits have an effect on the international posture of a firm. The cause to invest in ICT might be not intended to increase internationalization per se but impacts the degree of internationalization at a later point of time through a reduction of the overall transaction costs. As a result, the cause and effect should be assessed individually. We are focusing on the effect of an overall reduction of transaction costs caused by ICT investments. In the context of internationalization, transaction cost play a key role, too. We discuss this in detail in section 2.2.

Second, from a statistical lens, the proposed relationship is maybe subject to reverse causality and endogeneity. Thus adding a time lag in the independent variable, measuring ICT intensity, separates the proposed effect and reduces reverse causality because the investment has to be made before the potential benefits impact the degree of internationalization. Moreover, adding several endogenous variables that may cause confounding effects are used to separate cause and effect.

Third, manipulation of the dataset such as randomising and adding certain restriction to the model will further strengthen the separation of cause and effect. In section 8 we applied different manipulation strategies to test the robustness of our main analyses.

2.2 Transaction costs and ICT in international business

We following prior international business research which argues that firms expand across borders until the associated costs outperform the benefits (Buckley and Casson, 1976; Rugman and Verbeke, 2005; Kirca et al., 2011). We argue that investments in ICT help firms to improve processes and mechanisms which reduce transaction costs and subsequently hampering further international expansion. Transaction costs result from the asymmetrically and incompletely distributed information

⁴see Arora, Gittelman, Kaplan, Lynch, Mitchell, and Siggelkow (2016) for more details about intertwined relationships in strategy and international business research.

⁵The essential role of causality in the proposed model was highlighted by the second supervisor. Thank you for the fruitful review and comments.

among two or more economic agents, which are either internal or external to the firm (Cordelia, 2006). Recent international business research suggests that ICT reduces information asymmetries between internal and external parties, in both their home and their host country (Coviello et al., 2017).

MIS scholars have theoretically and empirically investigated the impact of ICT on firm level outcomes, such as profitability (Mithas et al., 2012) or returns of R&D (Ravichandran, Han, and Mithas, 2017). The majority of MIS scholars have focused on functional or project-level research by assessing the impact of ICT from a transaction costs perspective Drnevich and Croson (2013). The empirical findings reveal that both internal and external transaction cost drivers impact a firm's international business strategy. We bridging findings from the MIS field to the the international business research and arguing that investments in ICT reduces transaction costs which are key for further international expansion for two main reasons.

First, from an internal perspective, the MIS literature shows that ICT helps MNEs to gain superior information about internal business processes and hence makes internal coordination and communication more efficient. Bloom et al. (2014) found that advanced ICT adoption is associated with more plant autonomy and wider control span for headquarters. This finding in particular supports MNEs that operate in multiple countries and have to manage multiple stakeholders. Moreover, Bloom et al. (2014) provided empirical evidence that adapting ICT reduces coordination, communication, and knowledge acquisition costs. Knowledge acquisition is central to the internationalization process. The importance of knowledge is well documented in the Uppsala model and related research. The key argument is that firms benefit from knowledge about diverse foreign counties. Such knowledge is expected to reduce transaction costs in the internationalization process and to increase the degree of internationalization (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017).

As MNEs typically operate in multiple geographical locations, they must process not only more information but also more diverse types of information than their local counterparts (Ning and Tanriverdi, 2017). Consequently, speed and information quality are critical factors for staying competitive in the host and the home country. Prior research has shown that both information gathering and the speed of information exchange across borders significantly increase with ICT (Malone, 1987; Bakos, 1991; Ciborra, 1996; Iyengar, Sweeney, and Montealegre, 2015). Thus, ICT makes organizational learning and knowledge transfer more effective (Tippins and Sohi, 2003; Iyengar et al., 2015). Building on this finding, we argue that such ICT-enabled advantages enable faster decision-making on a broader scope of information. This, in turn, helps MNEs to process information from multiple international locations while keeping internal transaction costs low.

Second, with regard to ICT lowering internal transaction costs, the MIS literature, and to some extent international business literature, has shown that ICT also reduces external transaction costs. Ruigrok, Amann, and Wagner (2007) found that agency costs occur if international expansion increases and may subsequently hamper further firm internationalization. Agency costs arise from discrepancies between the objective of the principal and the agent (Gurbaxani and Whang, 1991). Rangan and Sengul (2009) showed that the emergence and the deployment of ICT mitigate transaction hazards due to higher coordination, observability, and contractibility with external parties. This enables reducing discrepancies between the principal (i.e., MNE) and the local external partner (i.e.,

agent). Thus, we argue that ICT intensity can help MNEs to operate more efficiently with external parties at lower costs.

On a more general level, this assumption is supported by Rangan and Sengul (2009). Their empirical evidence shows that internalization and internationalization are less connected under the condition of high ICT intensity. They also found that MNEs with high ICT deployment are less transnationally integrated (production wise) and more evolved in arm's length exchanges. Zaheer and Manrakhan (2001) extended these findings by showing that ICT widens the geographical dispersion of IB networks. From an operational perspective, the management literature has suggested that ICT lowers search costs, transportation costs, inventory holding costs, and communication costs (Malone, 1987; Gurbaxani and Whang, 1991; Afuah, 2003). On this basis, we conclude that ICT helps MNEs to reduce external transaction costs through improved observability, contractibility, and coordination. The reduction in external transaction costs will help the firm to operate at a higher degree of internationalization.

However, implementing ICT involves additional upfront costs. These, in turn, lower the net benefit of ICT. The positive effect on internal and external costs accelerates only after successful development and integration. Cordelia (2006) highlighted the role of interdependency between ICT's cost-saving potential and its costs. Ciborra (1996) indicated that ICT is expected to lower transaction costs but only pays off if savings exceed the costs of development, introduction, and implementation. The underlying assumption is that "once acquired, ICT does for free what intermediaries do for a fee." Cordelia (2006, p.197). The literature has suggested that the positive effects of ICT investments will occur with a certain delay and will vary depending on industry sector and application (Devaraj and Kohli, 2003). Since MNEs must deal with different intermediaries in the internationalization process, and since the costs of software and hardware have sharply decreased over the last decade (Bharadwaj et al., 2013), we argue that ICT intensity will support firms in operating at a higher degree of internationalization than their less ICT-intense peers.

Given that transaction costs result from asymmetrically and incompletely distributed information among two or more economic agents, we argue that ICT will help MNEs, from both an internal and an external perspective, to reduce information asymmetry after the time lag required for integration. Such advantages help firms to further strengthen their international posture which results in a higher degree of internationalization. In particular, we expect ICT to decrease managerial and administrative costs and to foster MNEs' openness to foreign markets due to lower internal transaction costs. Moreover, we argue that ICT helps to reduce external transaction cost drivers, i.e. search and monitoring costs in remote geographical locations. This positive effect results from increasing observability, coordination, and control, which have been recognized as key uncertainty drivers in international business (Antràs, 2005). Thus, the resulting advantage of ICT is likely to increase the degree of internationalization in an open economy. In short, we expect that ICT intensity positively impacts MNEs' degree of internationalization.

Hypothesis 1. The higher an MNE's ICT intensity, the higher the degree of internationalization.

2.3 The moderating role of cultural distance

The importance of cultural distance have been recognized for over 30 years in the international business literature (Beugelsdijk, Kostova, Kunst, Spadafora, and van Essen, 2018a; Verbeke et al., 2018; Cuypers, Ertug, Heugens, Kogut, and Zou, 2018). Kogut and Singh (1988)'s concept of cultural distance has been widely used in the international business literature and beyond (Shenkar, Luo, and Yeheskel, 2008; Tung and Stahl, 2018). Essentially, the concept describes the degree of distance between home and host countries along various cultural dimensions. At the most general level, culture can be defined as the values, norms, beliefs, and behavioral patters of different nationalities (Leung, Bhagat, Buchan, Erez, and Gibson, 2005). Both agency cost and transaction cost driven research have outlined that increased cultural distance increases managerial and administrative costs before and after market entry and thus hamper internationalization (Rugman and Verbeke, 2004, 2005; Ruigrok et al., 2007; Ruigrok, Georgakakis, and Greve, 2013). The underlying assumption is that distance affects uncertainty and results in additional costs (Zaheer, Schomaker, and Nachum, 2012; Maseland, Dow, and Steel, 2018). In this study, we propose that ICT helps to reduce those costs that increase due to cultural distance, and thus positively moderate the relationship between ICT and the degree of internationalization. Two reasons support our expectation.

First, through an internal lens, establishing a shared perception of procedural processes and achieving a common understanding of their business objectives are key challenges for MNEs, which, by their very nature, face significant cultural distance in their foreign operations (Lew, Sinkovics, Yamin, and Khan, 2016). From a hierarchical organization perspective, decision making, regardless the location, requires information and relevant knowledge about the problem in hand. In matching problems and solutions, culture can play a key role through differently perceived values and norms. The recent MIS literature shows that ICT has the potential to centralize knowledge and to decentralize information at the same time (Bloom et al., 2014). This, in turn, supports firms in distributing the right amount of information across different stakeholders and thus mitigating the risk of misunderstanding. In particular applications like enterprise resource planning systems (ERP) help firms to consolidate multiple information sources and location-independent activities into a unified system (Bloom et al., 2014). Such ERP systems allow firms to share, store, and retrieve information about sales, production, orders, machine failures, stocks, as well as other metrics (e.g., human resources) and organizational aspects in real time. We argue that such systems enable firms to determine the hierarchical level at which decisions should be made so as to best manage the challenges arising from cultural differences. In other words, such systems enable firms to shift routine problems toward the "lower" levels in the hierarchy while moving exception decisions toward the upper echelons. Thus, the "lower" levels can be supported with more specific information about routine problems and the exceptions can be handled by experts. The latter will receive centralized information sourced from around the world regardless of cultural distance. Similar mechanisms can be observed in law firms, for instance, where junior lawyers handle the paperwork and prepare the documents while the senior lawyers add their expert knowledge. Similar processes apply in production where workers tackle routine problems and plant managers the exceptions.

In the context of cultural distance, such ICT-enabled capabilities can support firms to configure the decision-making process according to their international capabilities. On the one hand, this

reduces the uncertainty and costs arising from cultural distance, whereas on the other, it increases the importance of managers' and top management teams' international experience.

Second, through an external lens, culture affects MNEs' foreign operations due to the difference in customer preferences and the need for adaptation to the local environment (Beugelsdijk, Slangen, Maseland, and Onrust, 2014). Research on foreign responsiveness suggests that ICT enables firms to better adapt and respond to culturally diverse environments (Ramarapu and Lado, 1995). The concept of foreign responsiveness implies that global markets shift on a regular basis. Thus, firms have to adjust their product features and consequently their production and distribution approaches as well as marketing and pricing (Hamel and Prahalad, 1983). Based on the foreign responsiveness perspective, we suggest that ICT supports MNEs in identifying, reacting to, and orchestrating the necessary changes more efficiently than their less ICT-adapted counterparts. Existing research shows that ICT supports firms with customer relationship management (CRM) systems that enable easily customized and segmented marketing across different geographical locations. Furthermore, ICT can support MNEs in offering digital products that can be personalized to cultural preferences without requiring significant adjustments to the original product (Boudreau, Loch, Robey, and Straud, 1998; Sambharya, Kumaraswamy, and Banerjee, 2005; Brynjolfsson, Geva, and Reichman, 2016). Such advantages will help firms to protect themselves against the problems arising from cultural distance and hence against potentially increasing transaction costs. At the same time, ICT enables firms to identify and react more efficiently to different customer preferences. Based on the theoretical arguments and evidence for the foreign responsiveness perspective, we predict that increasing levels of cultural distance strengthen the impact of ICT on the degree of internationalization.

Hypothesis 2. The positive relationship between ICT intensity and the degree of internationalization is more pronounced in MNE operating at a high level of cultural distance.

2.4 The moderating role of industry dynamism

Industry dynamism describes to what extent a firm faces volatility and unpredictability in its external environment (Dess and Beard, 1984). Industry dynamism is expected to increase managerial and administrative costs and to hamper international expansion. MNEs operating in dynamic industries (e.g., high technology or pharmaceutical industries) face unexpected market changes, which force managers to frequently rethink their business strategy (Child, 1972; Dess and Beard, 1984). Volatile customer preferences, rapid product obsolescence, or price changes by competitors cause industry dynamism. Recent research indicates that under such conditions forecasting demand in different markets proves to be challenging. Consequently, a firm either overestimates or underestimates its market position and faces opportunity costs or losses in either case (Claussen, Essling, and Peukert, 2018).

ICT occupies a key role for at least two reasons in such dynamic business environments. First, ICT fosters strategic actions and interaction, e.g., price changes, marketing (Alcácer et al., 2016). The MIS literature suggests that such digital capabilities can lead to hyperturbulent markets and industries. Hyperturbulent markets are characterized by faster rate of price changes and shorter product life cycles, leading to faster strategic actions among competitors (Agarwal and Tiwana,

2015; Ning and Tanriverdi, 2017). This increases not only dynamism in an industry but also the risk for firms to enter a foreign market. Hence, a lack of ICT capabilities may be a competitive disadvantage and hamper international expansion.

Second, ICT supports firms in identifying and responding to such external and unpredictable changes. Such changes are key to MNEs' market position and international competitiveness. Recent research suggests that ICT supports the ability of firms to react to such environmental changes with more speed, ease, and dexterity (Tallon and Pinsonneault, 2011). Scholars have also shown that ICT-supported knowledge generation, knowledge sharing, and collaboration within the firm and with external parties play a key role in this respect (Reich and Benbasat, 1996; Gibson and Birkinshaw, 2004; Preston and Karahanna, 2009).

Based thereupon, we expect that firms with a high level of ICT can source both internal and external knowledge at lower costs regardless of location. Furthermore, we expect that ICT reduces the costs of communication with internal departments, suppliers, key business partners, and customers. This, in turn, strengthens the firm's agility and competitive position in a dynamic environment (Tallon and Pinsonneault, 2011).

If this is correct, such abilities may be said to help the firm to identify and respond to industry dynamism. Thus, we expect that ICT facilitates superior information. This will help firms to detect changes in their business environment before deciding on a course of action to produce the best possible response (Barki and Pinsonneault, 2005). Since such challenges increase with the degree of internationalization, due to more diverse markets and more competition, we expect that the advantages resulting from implementing ICT will be more pronounced under the condition of high-level industry dynamism and thus will help firms to enhance their standing in a dynamic environment.

Hypothesis 3. The positive relationship between ICT intensity and the degree of internationalization is more pronounced when an MNE faces a high level of industry dynamism.

3 Methods

3.1 Sample and Data

We started with all listed companies (as at December 31, 2011) in Switzerland, Germany, the Netherlands, and the United Kingdom. These countries were chosen for the following reasons. First, they headquarter several larger publicly listed and globally operating firms. Second, they provide a sufficient level of digital infrastructure to exploit the proposed effects of ICT. Third, they are listed as the leading stock exchanges in the European Union. Fourth, they have adopted standardized reporting practices, which enabled us to collect firm-level (e.g., foreign sales) and TMT data from archival sources (e.g., annual reports and corporate websites).

Firm and industry data were gathered from the Thomson Reuters Eikon database. For all technology-related variables, we used Aberdeen's European database. The Ci Technology database was established by Harte Hanks, an international marketing and information company known today as Aberdeen. Aberdeen collects plant-level data for over 160,000 firms across 20 European countries, and for over 250,000 companies in the US (Bloom et al., 2014). This database is used by leading

academic journals to obtain IT- related variables⁶ (e.g., Ray et al. (2013), Bloom et al. (2014), Kim, Mithas, and Kimbrough (2017)). The Ci Technology database has two limitations. First, Harte Hanks provides no information about the interviewees. Age, gender, education, nationality might have an impact on the interviewee and his or her interpretation of the provided answers and thus on the dataset. Second, the database introduced their own company identifiers. Thus, a manual matching was necessary to link Harte Hanks data with other firm level data. This manual matching might be subject to human error and is potentially a significant limitation for large scale studies. To reduce the human error in linking Harte Hanks identifier with a standard identifier (i.e., ISIN Number) two independent researcher manually added ISIN numbers to the Harte Hanks dataset. Subsequently inconsistencies have been corrected.

Top Management Team (TMT) data were collected manually from companies' annual reports and websites. In line with other studies in the field of TMT research, we defined TMT as the highest level of managers by following the definition used by firms in their annual reports (Nielsen and Nielsen, 2013; Ruigrok et al., 2013; Boone, Lokshin, Guenter, and Belderbos, 2019).

We started with all firms that were headquartered in the four countries between 2011 and 2017. Next, all selected publicly listed companies were ranked by market capitalization as of December 31, 2011. The top 100 firms of each country were included if they met the following requirements. First, we excluded all small and medium-sized firms (SMEs). We followed the European Union's definition: "companies with less than 250 staff headcounts, annual revenues of less or equal to EUR 50 million, and total assets of less or equal to EUR 43 million" EuropeanUnion (2017). Second, we excluded pure holding entities or financial investment vehicles and firms that were listed with a primary two-digit SIC code of 67. Third, we excluded subsidiaries that were unable to make independent strategic decisions.

The resulting sample included 378 companies in the four countries. Excluding companies with missing data reduced the sample to 50 companies from Switzerland, 40 companies from Germany, 31 companies from the Netherlands, and 68 companies from the United Kingdom. The remaining firms (189) were active in 46 industries (two-digit SIC was used as an industry identifier). The resulting final data set was an unbalanced panel data set with 567 firm year observations that enabled longitudinal analyses. Due to missing TMT data our data set is limited to the years 2011, 2013, 2015. Thus, we were able to capture environmental influences. These resulted from differences in years, countries, industries, and firms that could have otherwise biased the generalizability of our results. Given that ICT can also occur in the process of minimizing costs in an already internationalized organization our analysis maybe is subject to reverse causality and endogeneity issues. To address reverse causality we lagged the ICT investment (IV) by two and three years and run panel regression analysis with firm year observations to address this issue. We also control for several endogenous variables that may cause confounding effects – such as cultural distance, industry, product diversification as well as international experience of the TMT. Our lagged and panel approach, in this regard, allows us to capture the proposed causality. We used STATA 14 to perform all quantitative analyses.

Our study is based on a pooled time series panel data set. This approach allowed us to control for unobserved heterogeneity and to take into account within and between unit effects. Prior research has

⁶Please see Bloom et al. (2014) for further information about the CiTechnology database.

suggested using a generalized least squares (GLS) regression for such panel data sets. We preferred GLS regression due to autocorrelated error terms and cross-sectional heteroskedasticity (Sayrs, 1989). Thus, our analysis used GLS regression with random effects. We used random instead of fixed effects for two reasons. First, differences within companies impact our dependent variable. We also expected invariant variables to matter in our context. Thus, we applied a random effects approach. Second, we applied the Hausman test and the Lagrange-multiplier test to validate our decision quantitatively. The Hausman test failed to reject the null hypothesis, ($X^2 = 2.24$, $p < 0.946$). Thus, we considered a random effects model to be more appropriate. The Lagrange-multiplier test was used to test whether an OLS or random effects GLS regression is more suitable. The result was statistically significant ($X^2 = 427.81$, $p < 0.000$) and thus supports our decision to use GLS regression with random effects (Breusch and Pagan, 1980). Moreover, we conducted a t-test and a Kolomgorov-Smirnov (KS) test to ensure that our results are not biased due to a reduced number of observations. Both tests have been not significant - T-test ($p < 0.490$) and KS test ($p < 0.974$). Thus, we can not reject the Null Hypothesis which states that the difference in the mean or distribution between the analyzed sample and the full dataset is not 0. Thus, our sample is not biased by the reduced number of observations.

3.2 Measures

3.2.1 Dependent Variable

The degree of Internationalization was measured as the ratio of foreign sales to total sales - DOI (FSTS). For all geographical segments, we used Thomson Reuters Eikon data. We cross-checked the values of the segments in firms' financial statements and, if necessary, corrected these (Abdi and Aulakh, 2018).

3.2.2 Independent Variable

To measure ICT intensity, we used plant-level IT data from Aberdeen (former Harte Hanks) to measure ICT intensity. Since the matching process in some cases yielded multiple plants per firm, we followed Bloom et al. (2014) and aggregated IT plant-level data pooled across 2009-2015 to firm level, using plant revenue weights⁷. Similar aggregation processes have been used in other information science and business strategy literature (Bresnahan, Brynjolfsson, and Hitt, 2002; Brynjolfsson and Hitt, 2003; Beaudry, Doms, and Lewis, 2010). Since existing literature has shown that ICT investments pay off after time lags, we applied two time lags. A two-period lag by $t - 2$ in time period t (Devaraj and Kohli, 2003) and three-period lag $t - 3$ in time period t (Awate and Mudambi, 2018). Both time lags resulted in the same results. Since the variable was not normally distributed, we used its natural logarithm (Boone et al., 2019).

3.2.3 Moderator

Cultural distance is measured using the KS-Index (Kogut and Singh, 1988), one of the most widely used variables for measuring cultural distance in international business (Beugelsdijk, Ambos, and Nell, 2018b). The index calculates national cultural difference by the composite difference along a set of Hofstede's dimensions. We used Hofstede (1980)'s four cultural dimensions: individualism-collectivism, uncertainty avoidance, power distance, and masculinity-femininity.

$$KS - Index = \sum_{i=1}^n \{(I_{ij} - I_{iHome})^2 / V_i\} / N$$

where I_{ij} refers to the mean score on Hofstede's i th dimension of the host country. I_{iHome} refers to the country's mean score on the same Hofstede dimension. V_i refers to the variance of the i th dimension while N represents the number of dimensions (Beugelsdijk et al., 2018b). We applied the KS Index between the home country, where a company was headquartered, and the foreign country where the company reported sales activities. As some companies only reported sales per region, we used the average cultural values of the respective countries within that region. We manually cross-checked the reported figures with respective company annual reports. Cultural distance may hamper companies' foreign expansion and significantly increase transaction costs. Prior literature has suggested that cultural distance may negatively impact firms' international expansion (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017; Rugman and Verbeke, 2004, 2005).

⁷For a detailed overview of the measurements used for IT-related variables, see (Sabherwal and Jeyaraj, 2015)

Industry dynamism describes the level of change in industry instability faced by the firm (Dess and Beard, 1984; Ruigrok et al., 2013). We followed Dess and Beard (1984) by defining our measurement using multiple indicators. First, we computed the regression coefficient of time in terms of the average annual sales in firms' two-digit industry during 2011-2017. Second, we divided the standard error of the regression slope by the average sales of the respective industry (Zhang and Rajagopalan, 2004). The results represent the dynamism of each industry. This measure allowed us to capture the impact of the uncertainty resulting from the industry in which firms were operating at the time. This, in turn, enabled testing whether ICT matters under such dynamic and uncertain conditions.

3.2.4 Control Variables

Firm size is a common control measurement in the international business literature. Firm size controls for differences potentially arising due to size differences. In our context, it is important to control for firm size for two reasons. First, ICT intensity likely depends on firm size. Second, the total sales volume may also be influenced by firm size. We measured firm size as the total number of employees. As we only considered MNEs, this variable was not normally distributed, and we used the natural logarithm of the variable (Boone et al., 2019). Country was used to control for country-level differences. This is important for two reasons. On the one hand, because we used a multi-country European sample, and as Alcácer et al. (2016) have indicated, firms can be biased or promoted in ICT by their home country. On the other hand, the need to expand across national borders may depend on the size of the home market. For instance, firms in Switzerland or the Netherlands have a greater need to internationalize due to their relatively small home market. We used a dummy variable (0 or 1) for all countries within the sample. Industry dummy variables (0 or 1) are used to control for industry differences on main SIC codes. Research and Development Intensity is a common measurement for firm innovation. In our context, it might influence the level of internationalization due to more customer- or market-specific innovations. We measured R&D intensity as the ratio of R&D spending to total sales (Belderbos, Tong, and Wu, 2018). Product diversification was measured as the amount of four-digit sic codes in which a firm was operating. Financial leverage was measured as the ratio of long-term debt to total capital, as international growth options are more likely to be financed by equity than debt (Belderbos et al., 2018). Industry munificence was calculated as the regression coefficient of time on the annual mean of revenues in the two-digit SIC industry of a firm for a three-year period divided by the mean value of sales for the same years (Dess and Beard, 1984; Nielsen and Nielsen, 2013). Top Management Team international experience represents the extent to which a TMT has gained career experience in different countries. TMT international experience is measured on the Blau Index as defined as: $Blauindex = 1 - \sum p_i^2$ where p_i is the relative proportion of a TMT member's career spent time in a country i (Bunderson and Sutcliffe, 2002). This measure has been applied by most prior studies to calculate intrapersonal experience diversity among TMT members (Cannella and Holcomb, 2005). The TMT's international experience impacts a firm's internationalization behavior (Ruigrok et al., 2013). It thus served as an important control variable, one often neglected in IT-related studies (Bharadwaj, 2000).

4 Results

Table 8 presents means, standard deviations, and bivariate correlations. We calculated the variance inflation factor (VIF) for each variable based on a OLS model, in order to test for potential multicollinearity problems. The mean VIF score is 1.21 and the highest value among the used variables is firm size with a score of 1.5. Thus, all our results are below the recommended limit of 10, i.e., unaffected by multicollinearity. In addition, we applied further diagnostics to the full model in order to test for causality and other possible violations of the underlying regression assumptions. Regarding normality, linearity, and homoscedasticity, the tests all aligned with the regression assumptions and thus no violations were identified.

Table 8: Correlation Matrix

	Count	Mean	Standard Deviation	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) DOI (FSTS)	567	77.01	23.88											
(2) Research and development intensity	567	3.42	5.29	0.1992*										
(3) Return on Assets	567	5.87	7.86	0.0237	0.1129*									
(4) TMT international experience	567	0.53	0.33	0.3094*	0.1914*	0.0305								
(5) Firm size	567	9.53	1.44	0.1170*	0.0431	-0.0613	0.1698*							
(6) Industry munificence	567	0.01	0.14	-0.0219	-0.0301	0.1664*	0.0299	-0.1054*						
(7) Industry dynamism	567	0.30	0.23	-0.0607	-0.0260	0.0099	-0.0689	-0.0317	0.1994*					
(8) Cultural distance	567	4.59	6.02	0.1339*	0.0676	-0.0742*	-0.0413	0.2132*	-0.0587	0.0013				
(9) Financial leverage	567	0.57	0.18	-0.1399*	-0.1474*	-0.2736*	-0.1063*	0.4412*	-0.1116*	0.0315	0.0628			
(10) Product diversification	567	1.10	1.45	0.0481	-0.0441	-0.0170	0.0451	0.1546*	0.0005	0.0761*	0.1805*	0.1569*		
(11) ICT intensity	567	5.66	1.92	0.0595	0.0708	-0.0619	-0.0591	-0.3610*	0.0157	0.0286	-0.1139*	-0.3027*	-0.1819*	

* $p < 0.05$

To test our hypotheses, we ran five models, adding the predefined independent variables and moderators. Table 9 reports the results of GLS regression analysis for all models. The model 1 only includes control variables. In the next model, model 2, we tested Hypothesis 1, i.e., that ICT positively impacts the degree of internationalization. The results of model 2 support our hypothesis by showing a highly significant and positive effect (1.607, $p < 0.000$). Hypothesis 2 suggested that the level of cultural distance impacts the positive relationship between ICT intensity and the degree of internationalization. The results of model 3 also provide positive and significant support (0.552, $p < 0.05$) for Hypothesis 2. The positive effect of ICT intensity becomes more pronounced under the condition of high cultural distance; Figure 6 provides a detailed illustration of the moderating effect with (+/- 1 standard deviation).

Hypothesis 3 proposed that industry dynamism positively moderates the baseline relationship between ICT intensity and the degree of internationalization. As expected, we found evidence of a statistically significant and positive effect (6.130, $p < 0.05$) (see the model 4). The results, displayed in Figure 7, indicate that for low-level (- 1 standard deviation) industry dynamism, ICT has a marginal negative moderating effect whereas at a high level of industry dynamism (+ 1 standard deviation) ICT intensity has a strong positive moderation effect.

Model 5 was run simultaneously with both moderators (cultural distance and industry dynamism). The results indicate that ICT matters in the context of high-level cultural distance (0.574, $p < 0.05$) and industry dynamism (6.360, $p < 0.01$). Consequently, ICT intensity may said to significantly impact the degree of internationalization. Furthermore, our results provide empirical evidence that

uncertainty, arising from cultural or industry, positively strengthens the baseline effect. By way of additional analysis, we ran the same model under the condition of two-digit industry SIC dummy variables (Kim et al., 2015). The results provide similar significance levels and fully support our model (see Table 10).

Table 9: GLS Regression Results

	Model 1		Model 2		Model 3		Model 4		Model 5	
Firm size	3.745**	(2.68)	3.526*	(2.16)	3.666*	(2.19)	3.199†	(1.95)	3.368*	(2.00)
Return on Assets	-0.0653	(-0.96)	-0.110	(-1.59)	-0.120†	(-1.74)	-0.103	(-1.51)	-0.113†	(-1.66)
Research and development intensity	-0.0993	(-0.48)	0.00282	(0.01)	-0.00282	(-0.01)	0.0149	(0.06)	0.0109	(0.04)
Financial leverage	-5.860	(-0.92)	-7.587	(-0.99)	-8.514	(-1.11)	-3.441	(-0.44)	-4.284	(-0.55)
Germany	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Netherlands	5.752	(0.78)	7.400	(0.91)	7.916	(0.95)	6.610	(0.81)	7.300	(0.87)
Switzerland	14.43*	(2.13)	13.46†	(1.82)	13.75†	(1.83)	13.36†	(1.78)	13.77†	(1.81)
United Kingdom	12.18†	(1.93)	13.63*	(1.97)	13.38†	(1.91)	13.45†	(1.92)	13.22†	(1.87)
Industry munificence	-0.429	(-0.09)	2.538	(0.41)	1.312	(0.21)	1.586	(0.20)	0.554	(0.07)
Industry Dummy (SIC)	<i>included</i>		<i>included</i>		<i>included</i>		<i>included</i>		<i>included</i>	
TMT international experience	7.722*	(2.28)	8.497*	(2.30)	7.724*	(2.09)	8.927*	(2.42)	8.152*	(2.21)
Product diversification	0.381	(0.23)	1.116	(0.61)	1.159	(0.63)	1.382	(0.74)	1.443	(0.77)
ICT intensity			1.607***	(3.86)	1.367**	(3.19)	-0.626	(-0.65)	-0.962	(-0.99)
Cultural distance					-3.120†	(-1.79)			-3.352†	(-1.94)
ICT intensity × Cultural distance					0.552*	(2.25)			0.574*	(2.35)
Industry dynamism							-42.49*	(-1.98)	-43.29*	(-2.01)
ICT intensity × Industry dynamism							6.130*	(2.57)	6.360**	(2.68)
Constant	33.19*	(2.05)	26.06	(1.43)	27.70	(1.50)	40.20*	(2.09)	42.03*	(2.16)
Observations	567		567		567		567		567	
R ²	0.39		0.41		0.41		0.39		0.40	
Wald X ²	66.94***		77.54***		81.76***		83.53***		88.39***	

t statistics in parentheses. Main SIC was used as dummy variable to control for industry.

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

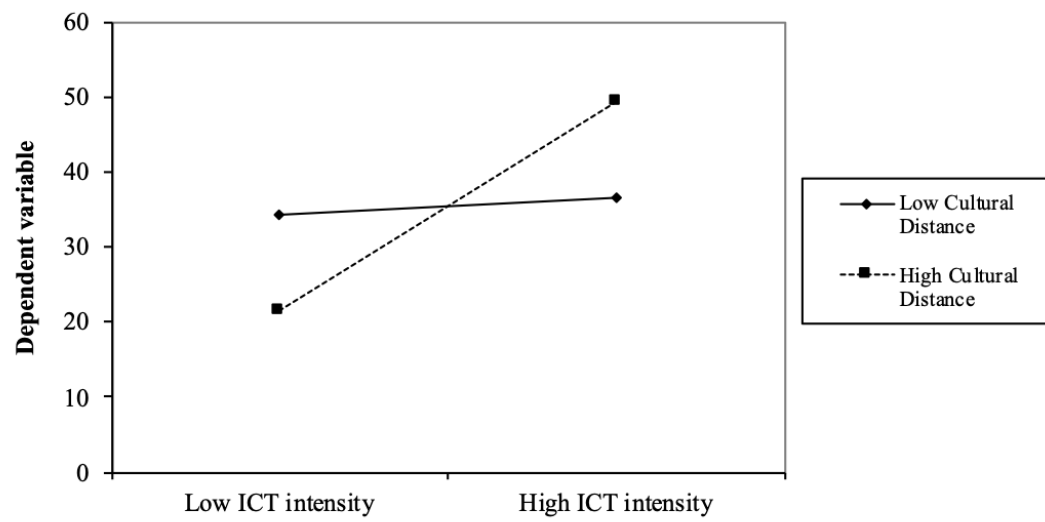
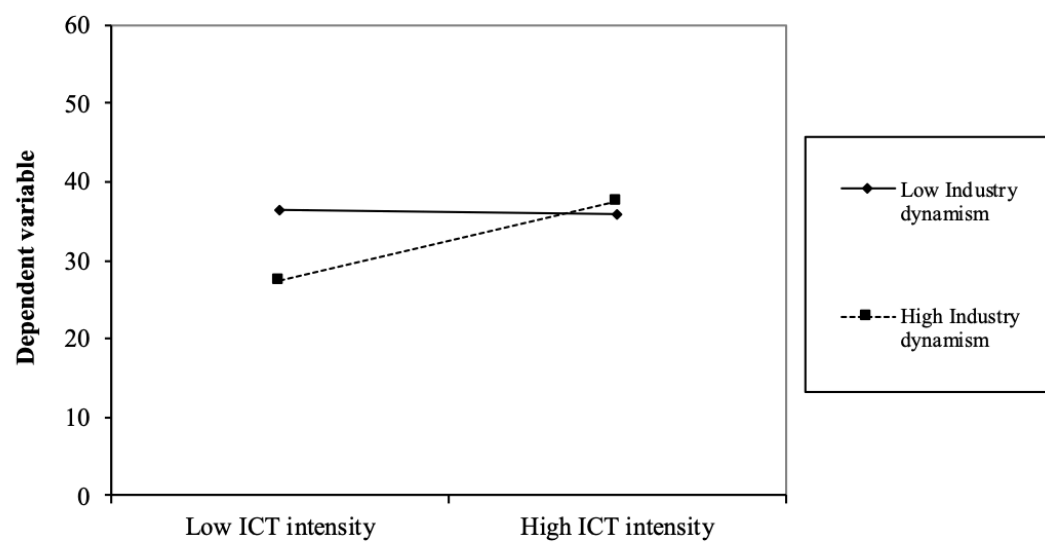
Figure 6: **Moderation: Cultural distance**Figure 7: **Moderation: Industry dynamism**

Table 10: **Robustness Test: GLS Regression Results Robustness Test**

	Model 1		Model 2		Model 3		Model 4		Model 5	
Firmsize	2.719 [†]	(1.84)	1.623	(0.92)	1.680	(0.93)	1.393	(0.78)	1.460	(0.80)
Return on Assets	-0.0610	(-0.89)	-0.102	(-1.46)	-0.113	(-1.63)	-0.0948	(-1.37)	-0.106	(-1.54)
Research and development intensity	-0.0785	(-0.38)	-0.0137	(-0.05)	-0.0246	(-0.10)	0.00364	(0.01)	-0.00645	(-0.03)
Financial leverage	-7.590	(-1.14)	-8.578	(-1.05)	-9.322	(-1.14)	-4.652	(-0.56)	-5.347	(-0.65)
Germany	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Netherlands	7.757	(0.99)	8.326	(0.99)	8.648	(1.00)	7.441	(0.87)	7.806	(0.89)
Switzerland	11.42	(1.50)	11.92	(1.44)	11.82	(1.40)	12.53	(1.50)	12.46	(1.46)
United Kingdom	11.12	(1.56)	12.95 [†]	(1.67)	12.49	(1.58)	12.62	(1.60)	12.14	(1.52)
Industry munificence	-1.088	(-0.22)	3.213	(0.52)	2.027	(0.33)	0.600	(0.06)	0.172	(0.02)
Industry Dummy (2-digit SIC)	<i>included</i>		<i>included</i>		<i>included</i>		<i>included</i>		<i>included</i>	
TMT international experience	5.455	(1.58)	6.641 [†]	(1.75)	6.006	(1.58)	7.209 [†]	(1.91)	6.573 [†]	(1.74)
Product diversification	1.675	(0.88)	4.042 [†]	(1.85)	4.072 [†]	(1.83)	4.278 [†]	(1.94)	4.322 [†]	(1.92)
ICT intensity			1.622***	(3.85)	1.396**	(3.23)	-0.772	(-0.78)	-1.047	(-1.06)
Cultural distance					-2.889	(-1.60)			-2.992 [†]	(-1.67)
ICT intensity x Cultural distance					0.531*	(2.12)			0.542*	(2.19)
Industry dynamism							-50.35	(-1.62)	-48.60	(-1.57)
ICT intensity x Industry dynamism							6.581**	(2.67)	6.695**	(2.73)
Constant	58.30**	(2.71)	58.34*	(2.44)	61.05*	(2.52)	73.66**	(2.92)	76.14**	(2.98)
Observations	567		567		567		567		567	
R^2	0.61		0.64		0.64		0.64		0.64	
Wald X^2	123.34***		128.70***		129.91***		133.59***		135.47***	

t statistics in parentheses. 2-digit SIC was used as dummy variable to control for industry.

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5 Discussion and Conclusion

This study has linked insights from the MIS literature with international business research by exploring the impact of ICT on MNEs' international business strategy. We focused on the degree of internationalization because cross-border expansion remains a major vehicle for MNEs' scale enhancement and growth. On top of this, the debate about what drives the degree of internationalization remains unsettled (Abdi and Aulakh, 2018). At the same time, digitalization and advanced ICT innovations are expected to affect all industries (Alcácer et al., 2016).

Despite the recognized importance of ICT in other fields (e.g., marketing or information science), international business and strategy research is only beginning to understand the impact of these technologies (Hazlehurst and Brouthers, 2018; Banalieva and Dhanaraj, 2019). Our two main questions — “How does ICT influence the degree of internationalization?” and “Under which conditions can MNEs benefit from ICT usage?” — are intended to contribute mainly to the international business and strategy literature by showing that ICT positively impacts the degree of internationalization. We

have provided empirical evidence that firms can leverage ICT in high uncertainty environments, i.e., industry dynamism and cultural distance. Thus, we provide three important contributions.

First, our findings support the suggestions that ICT gives firms unparalleled opportunities to engage with each other globally (Coviello et al., 2017; Alcácer et al., 2016). International business researchers should begin to investigate the role of digitalization and ICT in international business in more detail (Hazlehurst and Brouthers, 2018). One key finding of this study is that ICT intensity facilitates firm internationalization. Recent international business studies have underestimated the importance of understanding the implications of ICT and how digital innovations affect the assumptions of internationalization theory (Banalieva and Dhanaraj, 2019). We have followed this research stream by stressing that ICT intensity plays an important role in international business strategy (Hazlehurst and Brouthers, 2018). We assumed that firms exploit their FSA across borders in order to capture or generate value from imperfect markets until the associated costs outperform the benefits (Buckley, 1988; Kirca et al., 2011; Buckley, 2016). On this basis, we have shown that the advantage resulting from ICT filters uncertainty in the internationalization process. Such advantages help the firm to overcome transaction-cost challenges and thus increase its scope of internationalization.

Second, our findings challenge the role of cultural distance, a key feature of international business research. Prior to ICT and digitalization, international business scholars argued that increased cultural distance leads to higher managerial and administrative costs before and after market entry and thus hampers internationalization (Rugman and Verbeke, 2004, 2005; Ruigrok et al., 2013). Our findings modify this notion by showing that ICT intensity can create transparency and increase the firm's ability to stay competitive in culturally diverse environments. The mechanism of information availability at all levels of the organization increases due to ERP and CRM systems that pool information across the company and customers regardless of location at almost zero costs. Thus, such data-rich MNEs are able to align their internal and external processes with cultural differences. Further, our results support shifting the concept of places to information flow-based FSA (Banalieva and Dhanaraj, 2019). Thus, we cast new light on the hitherto unexplored role of ICT in cultural distance research. Our results show that firms facing much cultural distance can benefit even more from ICT than firms encountering little cultural distance (see Figure 6). Thus, our findings enrich prior international business studies on how cultural distance impacts degree of internationalization.

Third, our results extend understanding of how ICT impacts the degree of internationalization by showing that industry dynamism strengthens the impact of ICT on the degree of internationalization. By considering dynamic and unpredictable changes in firms' environment, we have linked ICT to a distinct dynamic factor, as opposed to the relatively "stable" cultural factor (Ning and Tanriverdi, 2017). These findings provide important insights into the condition under which ICT can support firms in staying competitive in a dynamic environment. Our findings provide empirical evidence that ICT increases firms' ability to identify and to respond to external dynamic changes. The resulting agility enables MNEs to increase their international positioning (see Figure 7). Our results indicate that less ICT-advanced firms, operating in low dynamic environments, will tend not to enter new markets whereas high ICT-advanced firms, in high dynamic environments, will be more likely to enter new markets. This result goes beyond the initially assumed moderation effects of cultural distance and industry dynamism. It highlights the key role of ICT and the tendency of hyperturbulent

markets (Ning and Tanriverdi, 2017). The result that high ICT intensity and low industry dynamism result in a negative moderation effect extends beyond our initial assumptions. It raises the question about whether ICT is an advantage or a necessity? The MIS literature argues that IT plays an important role as a “resource multiplier, and enhancer of existing capabilities, or an enabler of new capabilities in conjunction with existing resource portfolio rather than a stand-alone resource, since most IT, while valuable, is not inimitable or rare” (Drnevich and Croson, 2013, p.494). Thus, it is likely that “off the shelf” ICT solutions enable firms to reduce transaction costs internally and externally in relatively stable environments (cultural environment + low industry dynamism). In contrast, more dynamic environments, i.e. with greater industry dynamism, require inimitable, rare, and specific IT solutions able to provide distinct advantages (Bharadwaj, 2000; Bharadwaj et al., 2013). The data sighted do not allow us to filter for such firm-specific, mostly internally developed IT solutions. Nevertheless, our results contribute to better understanding under which conditions ICT might support firms in international business.

Apart from its academic relevance, this paper also has managerial implications, especially for practitioners about how to manage ICT with a view to internationalization. Along with the pressing need to better understand the impact of ICT and digitalization, internationalization and globalization remain “one of the oldest and most recurrent themes in international business (IB)” (Verbeke et al., 2018, p.1). At the intersection of these trends, our results may help managers to improve their international business strategy and to align their digital investments with envisaged degree of internationalization by considering cultural distance and industry dynamism. In summary, we conclude that ICT may be used to filter uncertainty and as such creates more transparency before and during the internationalization process. Such advantages help the firm to overcome the transaction costs arising from culture distance in the process of international expansion and thus to increase their scope of internationalization. In highly competitive environments, moreover, the advantages of ICT need to be interpreted carefully, since ICT is not a source of competitive advantage per se.

6 Limitations and avenues for further research

The limitations of this study open up promising avenues for further research. We have argued that ICT can influence the degree of internationalization and that this positive effect will be more pronounced the greater the uncertainty. Admittedly, however, our measurement of ICT intensity is coarse. Our approach has the advantage that it enables a cross-industry research design. Since different industries require diverse digital and ICT-enabled technologies, industry-specific ICT measures will likely produce stronger results. However, much of the existing empirical work has used an aggregated IT measure (Ray et al., 2013). Thus, we recommend that further research ought to focus on specific industries and use industry-specific ICT measurements in order to gain stronger and more specific results. Furthermore, future research should look at the origin of ICT investments to strengthen our understanding of the mechanism. Particularly, the distinction between investments in new technology and investment in current technology should be considered. This distinction is important because changes in international business strategy might inflate the measure due to heavy investments in new technology as part of a digital transformation. A promising avenue for future research is to focus on Cloud vs. On-premise ICT investment strategies. Cloud services offer

significantly less investment upfront, this might change the relationship or might positively moderate the relationship between ICT and DOI.

Another limitation of our study stems from our cultural distance measurement. Our key argument is that cultural distance increases the effect of ICT by using Hofstede (1980) cultural dimensions. Furthermore, previous research has suggested that culture changes over time and has proposed taking such dynamics into account. In particular, previous research has also pointed out that many countries are becoming less power distant, more individualistic, as well as more indulgent and emancipated (Fernandez, Carlson, Stepina, and Nicholson, 1997; Inglehart, 1997; Inglehart and Baker, 2000; Beugelsdijk et al., 2018a). We have not taken such dynamic changes into account and suggest that a more fine-grained measurement of cultural distance might be a fruitful research direction. Further, we recommend conducting more research about the interface between ICT and specific cultural dimensions. Similarly, existing research has highlighted the differences in the alternative ways of measuring cultural distance (Schwartz (1999) or Globe House, Hanges, Javidan, Dorfman, and Gupta (2004)). Beugelsdijk et al. (2018b) highlighted the importance of variations within national cultures. We have not considered such differences due to the limited availability of country-level cultural data. Thus, we acknowledge that more precisely measuring culture on the country or even regional level will be an important issue in future research. Another fruitful research avenue would be to focus on specific industries in order to continue the ongoing discussion on “advantage or necessity.” The question about causality has been extensively discussed in the MIS literature and remains unresolved (Drnevich and Croson, 2013). To isolate the cause and effect and move the discussion about causality forward matched sample methods and adding more restriction to the sample selection should be taken into account in future research to isolate cause and effect and thus contribute to MIS and international business research. Another important contribution could be made by identifying ICT components that might prove helpful amid cultural distance and in highly competitive environments. We suggest using a more specific measurement of ICT. This should take into account self-developed IT capabilities, as these are hard to imitate (and also rare) and may be expected to be a source of firm-specific advantage (for details, see Bharadwaj et al. (2013); Drnevich and Croson (2013)).

7 Conclusion

Digitalization and the use of ICT are likely to affect firms across all industries globally. Although this development is a key feature of international business, international business and strategy research is only beginning to understand the impact of digitalization and ICT on firm-level outcomes (Alcácer et al., 2016; Coviello et al., 2017; Hazlehurst and Brouthers, 2018; Banalieva and Dhanaraj, 2019). As MNCs continue to face high levels of complexity, we have addressed the transaction costs arising from cultural distance and industry dynamism. Not only have we shown that ICT fosters internationalization by reducing information and communication costs. We have also provided important insights into the role of uncertainty drivers (i.e., cultural distance and industry dynamism) and their manifold interactions with ICT. Our results show that, depending on context, MNEs can use the advantages resulting from ICT to leverage internationalization.

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8 Appendix

The following section presents additional analyses. We have added TMT international experience as a moderator. The results are stable. The moderating effect of TMT international experience, model 5, explains much of the moderating effect of industry dynamism, for more details see table 11.

Table 11: GLS Regression Results TMT International Experience

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Firmsize	3.425*	(1.428)	3.548*	(1.691)	3.770*	(1.697)	3.399*	(1.695)	3.263 [†]	(1.682)	3.429*	(1.691)	3.467*	(1.688)
Return on Assets	-0.0293	(0.0688)	-0.118	(0.0749)	-0.132 [†]	(0.0746)	-0.116	(0.0746)	-0.137 [†]	(0.0737)	-0.145*	(0.0736)	-0.147*	(0.0735)
R&D Intensity	-0.0238	(0.210)	-0.0267	(0.265)	-0.0419	(0.264)	-0.0199	(0.265)	-0.00890	(0.262)	-0.0215	(0.261)	-0.0228	(0.261)
Financial_Leverage	-3.268	(6.326)	-10.36	(7.797)	-11.83	(7.794)	-8.406	(7.852)	-11.01	(7.697)	-11.41	(7.789)	-12.29	(7.702)
Germany	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Netherlands	3.754	(7.498)	6.293	(8.123)	6.937	(8.169)	5.991	(8.154)	6.658	(8.107)	7.054	(8.170)	7.202	(8.156)
Switzerland	12.09 [†]	(6.740)	12.21	(7.523)	12.62 [†]	(7.560)	12.35	(7.549)	11.78	(7.505)	12.26	(7.557)	12.15	(7.545)
United Kingdom	10.85 [†]	(6.264)	13.34 [†]	(6.886)	13.11 [†]	(6.923)	13.32 [†]	(6.912)	12.63 [†]	(6.877)	12.49 [†]	(6.928)	12.45 [†]	(6.917)
Industry_munificence	1.665	(4.915)	-3.880	(7.810)	-4.998	(7.782)	-3.253	(7.797)	-2.912	(7.699)	-3.763	(7.691)	-3.950	(7.683)
Product diversity	0.0967	(1.662)	1.152	(1.835)	1.223	(1.845)	1.293	(1.844)	1.562	(1.835)	1.637	(1.849)	1.606	(1.846)
Industry	<i>Industry controls included</i>													
TMT international experience	8.712*	(3.431)	9.089*	(3.889)	8.322*	(3.884)	9.355*	(3.883)	39.12***	(9.054)	34.78***	(9.528)	37.05***	(9.067)
Industry_dynamism	4.506	(3.004)	-9.957	(15.28)	-9.395	(15.29)	-38.21 [†]	(21.67)	-11.41	(15.17)	-23.29	(22.04)	-10.87	(15.19)
Cultural distance	0.131	(0.809)	0.273	(0.968)	-3.468 [†]	(1.862)	0.186	(0.969)	0.386	(0.958)	-3.034	(1.851)	-2.910	(1.843)
ICT intensity			1.778***	(0.441)	1.453**	(0.459)	0.0638	(1.034)	4.426***	(0.843)	3.036*	(1.526)	4.016***	(0.860)
ICT intensity × Cultural distance					0.624*	(0.265)					0.562*	(0.263)	0.549*	(0.262)
ICT intensity × Industry_dynamism							4.689 [†]	(2.562)			2.088	(2.686)		
ICT intensity × TMT international experience									-4.769***	(1.301)	-4.167**	(1.387)	-4.544***	(1.299)
Constant	34.33*	(16.36)	27.74	(18.86)	29.50	(18.92)	37.55 [†]	(19.63)	14.56	(19.11)	22.22	(20.44)	16.79	(19.19)
Observations	567		567		567		567		567		567		567	
R ²	0.39		0.41		0.41		0.39		0.40		0.43		0.43	
Wald X ²	66.94***		77.54***		81.76***		83.53***		88.39***		93.44***		98.05***	

Standard errors in parentheses

Source: Camillo Werdich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We also tested our hypotheses in a fixed effects GLS regression. The results are consistent with our random effects model. Thus we conclude that our findings are robust, see table 12 for more details.

Table 12: GLS Regression Results Fixed Effects

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Firm size	2.544	(2.467)	1.756	(3.323)	1.543	(3.300)	1.621	(3.306)	1.526	(3.265)	1.309	(3.249)	1.352	(3.249)
Return on Assets	-0.0427	(0.0703)	-0.110	(0.0772)	-0.125	(0.0768)	-0.104	(0.0768)	-0.130 [†]	(0.0760)	-0.136 [†]	(0.0760)	-0.141 [†]	(0.0758)
R&D intensity	-0.0765	(0.236)	-0.0494	(0.332)	-0.0734	(0.330)	-0.0384	(0.330)	-0.00252	(0.326)	-0.0258	(0.325)	-0.0260	(0.325)
Financial Leverage	1.543	(7.120)	-5.938	(9.733)	-7.426	(9.683)	-3.867	(9.730)	-7.479	(9.572)	-7.539	(9.615)	-8.699	(9.539)
Industry						<i>Industry</i>	<i>excluded</i>							
Country						<i>Country</i>	<i>excluded</i>							
Industry munificence	1.502	(4.955)	-10.81	(10.06)	-11.23	(9.987)	-10.00	(10.01)	-10.61	(9.881)	-10.63	(9.838)	-10.99	(9.830)
Product diversity						<i>Product diversity</i>	<i>excluded</i>							
TMT international experience	6.971 [†]	(3.899)	8.067 [†]	(4.582)	6.947	(4.573)	8.703 [†]	(4.567)	39.79***	(10.14)	34.00**	(10.67)	37.12***	(10.17)
Industry dynamism	5.514 [†]	(3.144)	-36.92	(26.19)	-33.91	(26.03)	-70.91*	(30.67)	-40.51	(25.75)	-53.78 [†]	(30.58)	-37.68	(25.64)
Cultural distance	0.224	(0.990)	0.536	(1.316)	-3.527	(2.167)	0.443	(1.309)	0.817	(1.295)	-2.860	(2.148)	-2.754	(2.145)
ICT intensity			1.802***	(0.468)	1.488**	(0.483)	-0.332	(1.118)	4.457***	(0.888)	2.716 [†]	(1.642)	4.040***	(0.906)
ICT intensity × Cultural distance					0.663*	(0.282)					0.585*	(0.279)	0.580*	(0.278)
ICT intensity × industry dynamism							5.730*	(2.729)			2.782	(2.878)		
ICT intensity × TMT international experience									-4.839***	(1.386)	-4.059**	(1.485)	-4.580**	(1.384)
Constant	46.85*	(23.35)	60.74 [†]	(32.15)	65.74*	(31.99)	72.90*	(32.50)	47.10	(31.83)	59.61 [†]	(32.67)	52.20	(31.75)
Observations	594		594		594		594		594		594		594	
R^2	0.015		0.072		0.088		0.085		0.107		0.122		0.120	
Adjusted R^2	-0.207		-0.228		-0.211		-0.215		-0.185		-0.173		-0.173	

Standard errors in parentheses

Source: Camillo Werdich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

We also used a randomized sample (50%) to test causality of the main effect. The results are presented in table 13. The main effect in Model 2 is positive and significant. Thus we conclude that the proposed effect is captured by the initial analysis.

Table 13: GLS Regression Results Randomized Sample

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
Firmsize	5.049**	(2.99)	4.057 [†]	(1.68)	4.241 [†]	(1.76)	4.090 [†]	(1.69)	4.078 [†]	(1.71)	4.266 [†]	(1.78)	4.238 [†]	(1.77)
Return on Assets	-0.110	(-1.23)	-0.174	(-1.09)	-0.195	(-1.23)	-0.173	(-1.09)	-0.193	(-1.20)	-0.208	(-1.29)	-0.208	(-1.30)
Research & Development intensity	0.0345	(0.12)	-0.811	(-1.38)	-0.755	(-1.29)	-0.820	(-1.39)	-0.787	(-1.35)	-0.749	(-1.28)	-0.740	(-1.27)
Financial_Leverage	-8.965	(-1.10)	-11.78	(-0.99)	-10.65	(-0.90)	-12.40	(-0.98)	-11.09	(-0.94)	-10.78	(-0.85)	-10.21	(-0.86)
Industry	<i>Industry excluded</i>													
Country	<i>Country excluded</i>													
industry_munificence	2.431	(0.41)	5.981	(0.51)	3.178	(0.27)	5.898	(0.50)	5.721	(0.49)	3.154	(0.27)	3.201	(0.27)
Product diversity	-0.397	(-0.22)	-0.817	(-0.39)	-0.698	(-0.33)	-0.842	(-0.40)	-0.448	(-0.21)	-0.433	(-0.21)	-0.423	(-0.20)
TMT international experience	11.16*	(2.24)	25.34***	(3.57)	26.08***	(3.68)	25.33***	(3.56)	40.70*	(2.45)	38.43*	(2.22)	37.84*	(2.27)
Industry_dynamism	5.694	(1.53)	-7.008	(-0.36)	-9.547	(-0.48)	-3.422	(-0.11)	-8.047	(-0.41)	-6.782	(-0.20)	-10.15	(-0.52)
Cultural distance	0.0856	(0.08)	0.712	(0.49)	-2.867	(-1.08)	0.726	(0.49)	0.617	(0.42)	-2.621	(-0.96)	-2.689	(-1.01)
ICT intensity			1.536*	(2.32)	1.728**	(2.58)	1.735	(1.12)	3.206 [†]	(1.85)	3.241	(1.24)	2.990 [†]	(1.73)
ICT intensity × Cultural distance					0.620	(1.61)					0.566	(1.41)	0.577	(1.48)
ICT intensity × Industry_dynamism							-0.531	(-0.14)			-0.499	(-0.13)		
ICT intensity × TMT international experience									-2.799	(-1.03)	-2.258	(-0.79)	-2.146	(-0.79)
Constant	16.08	(0.84)	15.79	(0.61)	14.44	(0.56)	14.71	(0.54)	5.604	(0.20)	5.383	(0.18)	6.793	(0.25)
Observations	282		282		282		282		282		282		282	
R ²	0.41		0.45		0.45		0.45		0.48		0.47		0.48	
Wald X ²	72.98***		53.45***		54.05***		52.99***		59.66***		60.15***		59.87***	

t statistics in parentheses

Source: Camillo Werdich

[†] p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

Part IV

Internationalization Behavior In The Digital Age: Same Scope But Different Strategy

Abstract

This study examines the impact of information and communication technologies (ICT) on the scope, speed, and location dispersion of Foreign Direct Investment (FDI) by focusing on multinational enterprises (MNEs). We argue that FDI motives (knowledge seeking, market seeking) moderate the impact of ICT on FDI scope, speed, and location dispersion. We found partial support for our hypotheses. We used a dataset from four major European countries, consisting of 1,433 FDI deals between 2011 and 2015. Our study contributes to the emerging literature about internationalization in the digital age. Our findings show that ICT increases market-seeking FDI activities in terms of speed and location dispersion whereas with knowledge-seeking activities, ICT decreases speed and location dispersion. We found no significant differences for FDI scope.⁸

Keywords: Foreign Direct Investment (FDI); ICT; International Business

⁸Authors: Camillo Werdich, Winfried Ruigrok

1 Introduction

Digitalization and particularly innovations in information and communication technologies (ICT) have challenged the international business field and MNEs to re-examine its priors (Brouthers, Geisser, and Rothlauf, 2016; Hazlehurst and Brouthers, 2018; Banalieva and Dhanaraj, 2019). Innovations in ICT alter the transaction cost economics of cross-border transfers of competitive advantages (Mithas, Tafti, Bardhan, and Goh, 2012; Banalieva and Dhanaraj, 2019). Deal size, speed, and utilization of internationally connected networks have become major sources of competitive advantage for MNEs in their internationalization process (Chang and Rhee, 2011). The impact of ICT on Foreign Direct Investment (FDI) is well recognized in the economic geography literature while little is known about this phenomenon from a firm-level perspective (Alcácer, Cantwell, and Piscitello, 2016; Buonafede, Felice, Lamperti, and Piscitello, 2018).

MNEs use FDI to achieve two strategic objectives: (1) to internalize imperfect or enter new foreign markets until additional expansion outweighs the benefits; and (2) to reduce the overall costs of operations by choosing specialized locations for different activities (Buckley and Casson, 1976; Buckley, 2016; Mudambi, Li, Ma, Makino, Qian, and Boschma, 2018). To explain how the two strategic objectives can be realized, recent research has focused on transaction cost drivers, such as cultural and institutional distance between home and host country (Brouthers, 2002; Lu, Liu, Wright, and Filatotchev, 2014; Beugelsdijk, Kostova, Kunst, Spadafora, and van Essen, 2018a). Recent research has suggested going beyond the country level to enhance understanding of firms' FDI behavior. Spatial variation of location advantages at the national, regional, or even city level provide international business with important insights into (and thus help better understand) firms' FDI strategy (Mudambi et al., 2018).

Transaction cost theory has been the leading theoretical perspective in international business to explain an MNE's FDI behavior (Slangen and Hennart, 2007). The transaction cost perspective is used in internationalization theory to explain whether, where, and how fast firms expand abroad (Buckley and Casson, 1976; Buckley, 1988; Rugman and Verbeke, 2005; Chen and Kamal, 2016; Chen, Shaheer, Yi, and Li, 2019). Recent literature has emphasized that ICT reduces transaction costs in international business (Alcácer et al., 2016; Drnevich and Croson, 2013). Coviello, Kano, and Liesch (2017) highlighted that ICT has the potential to reconfigure the internationalization process in terms of timing, location choice, rhythm, and entry mode choice. Rangan and Sengul (2009) provided empirical evidence that ICT deployment impacts the internalization of foreign activities and shows that internationalization and internalization are less coupled than before the digital age. In contrast, recent research shows that the effect of digitalization on internationalization theory changes the role of places and the nature of FSA (Banalieva and Dhanaraj, 2019). Banalieva and Dhanaraj stressed the shift from the concept of places to digital information exchange. ICT enables MNEs to enter foreign markets at significantly lower transaction costs and with less physical assets than before (Alcácer et al., 2016).

According to Mudambi et al. (2018), the combination of local knowledge sourcing and global integration gives MNEs a global competitive advantage. This advantage results from the ability to create capabilities and integrate diverse knowledge pools while distributing products and services on a global basis. Local knowledge sourcing and global knowledge integration relates to two strategic imperatives of Dunning (1998): Market seeking represents global knowledge integration, asset

seeking local knowledge sourcing. Our study follows this research stream by assessing the impact of ICT on FDI deal size, speed, and location dispersion under the condition of market- and asset-seeking FDI activities.

The impact of ICT is becoming increasingly recognized in economic geographic, marketing, and information system research. The field of international business is lagging behind other disciplines and has only recently begun to assess the impact of ICT (Drnevich and Croson, 2013; Alcácer and Chung, 2014; Hazlehurst and Brouthers, 2018). Over the past decade, research has generated new insights into how ICT affects digital business strategy (Bharadwaj, 2000; Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013), IT usage and implementation (Devaraj and Kohli, 2003), Global Value Chain (GVC) (Gooris and Peeters, 2015), internal business processes and knowledge creation (Bloom, Garicano, Sadun, and Van Reenen, 2014), and firm profitability (Mithas et al., 2012). Despite these significant contributions, international business scholars have often neglected the role of ICT and have similarly paid insufficient attention to the difference between knowledge seeking and asset seeking (Hazlehurst and Brouthers, 2018). Our study addresses this research gap by asking: “How does ICT impact MNEs’ FDI behavior in terms of speed, scope, and location dispersion? And what is the impact of knowledge- and asset-seeking activities?”

Over three decades of international business research and high public awareness of digitalization, the impact of ICT on FDI behavior remains underresearched. IT business value literature has outlined how firms can benefit from ICT in many ways, including greater access to cheaper resources, increased market reach, and faster and more effective communication across geographical distance. International business, however, has not followed the emerging trend to the same degree as marketing or information systems research (Hazlehurst and Brouthers, 2018). Drnevich and Croson (2013) outlined how ICT research can be theoretically integrated into business level strategy research.

Hence, the main purpose of this study is to address the lack of a nuanced understanding of how ICT affects firms’ international business strategies. In particular, we empirically test the impact of ICT on firms’ FDI behavior. We consider FDI deal size, speed, and location dispersion, which have been identified as major sources of competitive advantage (Chang and Rhee, 2011; Chetty, Johanson, and Martín Martín, 2014; Alcácer et al., 2016). We thus respond to recent calls for more research on international business in the digital age (Coviello et al., 2017; Hazlehurst and Brouthers, 2018).

Our central argument is that ICT reduces uncertainty in the internationalization process, which, in turn, enhances a firm’s ability to expand its foreign business with less investment, yet faster, and with a wider geographical scope. The resulting advantage of ICT helps firms to centralize knowledge and distribute information at significantly lower costs. Such advantages will result in a more pronounced effect of market seeking and will be less pronounced for knowledge seeking FDI. Furthermore, such advantages will help the firm to enhance its standing in a diverse, competitive, and digital environment.

This study provides three main contributions to the field of international business. First, our research yields new insights into the role of ICT on FDI strategy. We go beyond the established factors like cultural or institutional distance and other country-level factors by zooming in on three key transaction cost drivers: deal size, speed, and location dispersion on the state level. In other words, we follow Mudambi et al. (2018) by looking at within-country effects rather than limiting our research to the country level. Second, we argue that the underlying reason (market seeking vs.

knowledge seeking) for FDI makes a key difference in interpreting the impact of ICT on MNEs' FDI strategy. Third, we cast new light on how international business is unfolding in the digital age by integrating ICT theoretically into the field.

2 Theory and Hypotheses

In explaining the FDI behavior of MNEs, various approaches in management, economic geography, and related fields have focused on MNE's activities (Alcácer et al., 2016; Mudambi et al., 2018). On the one hand, economic geography and regional studies have focused on the local context of firms. On the other, management research has focused on firms' need to achieve economies of scale and to minimize transportation costs (Alcácer et al., 2016). Recent research has highlighted the importance of more fine-grained analysis of how MNEs coordinate location dispersion, competitive advantage, and speed of FDI activities (Chang and Rhee, 2011; Alcácer et al., 2016). Digital innovations and notably ICT change the business environment more dramatically than previous innovation rounds (Leamer and Storper, 2001). Recent research shows that ICT modifies the internationalization process in terms of timing, location, rhythm, and entry mode choice (Coviello et al., 2017).

Studying the FDI behavior of MNEs embedded in international business research relates to a large body of international strategy research (Belderbos, Tong, and Wu, 2018). This literature stream has focused mainly on either transaction cost economics or Dunning's Ownership, Location, and Internalization (OLI) framework. Extant research has tested the impact of rapid FDI expansion (Chang and Rhee, 2011), organizational learning and evolution (Vahlne and Johanson, 2017), or environmental uncertainty (Belderbos et al., 2018) on firm-level outcomes and FDI behavior. Drawing on transaction cost theory and MIS research, we take an integrative perspective, arguing that ICT reduces transaction costs significantly and enables MNEs to expand through smaller FDI deals, faster, and more dispersed than their counterparts.

Internationalization theory offers the theoretical basis for understanding why MNEs undertake FDI. Internationalization theory suggests that firms exploit their FSAs across national borders in order to create or capture value from imperfect markets until the costs of further expansion outperform the net benefits (Buckley, 1988; Buckley and Casson, 2009). According to Kirca, Hult, Roth, Cavusgil, Perry, Akdeniz, Deligonul, Mena, Pollitte, Hoppner, Miller, and White (2011, p.48), "an MNE is created when a firm can increase its value by internalizing markets for certain of its intangible assets across national borders." Transaction costs between home and host country hamper the internationalization process in terms of speed, scope, and location choice. Transaction costs in international business can be broken down into internal and external transaction costs (Kim, Hoskisson, and Lee, 2015). Internal transaction costs are economic costs that arise from managing dependencies between activities within the firm, i.e., managing R&D teams at different locations. External transaction costs are economic costs that result from activities with external parties, i.e., monitoring costs or locating suppliers in a foreign country (Chen and Kamal, 2016).

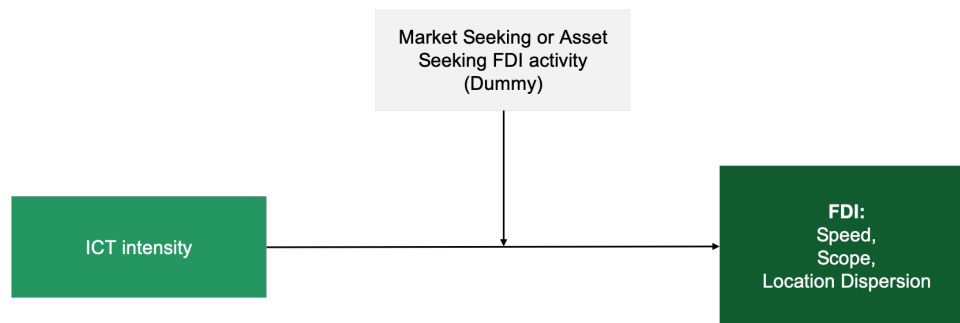
Recent literature has suggested that reducing internal and external transaction costs helps MNEs to increase MNEs' scope of internationalization and their FDI behavior (Alcácer et al., 2016). Combining local knowledge sourcing with global knowledge integration helps MNEs to create a

competitive advantage (Schotter, Mudambi, Doz, and Gaur, 2017; Mudambi et al., 2018). In addition, FDI speed may produce an additional, time-based competitive advantage (Chang and Rhee, 2011).

We follow recent developments in international business and assume that superior information reduces internal and external transaction costs. Thus, we expect that ICT impacts FDI behavior because MNEs can transfer and source knowledge from a larger international network. Banalieva and Dhanaraj (2019) has contributed to our understanding of FSA in the digital business world by showing that ICT plays a key role in firms' international business strategy.

We also follow the emerging research stream about internationalization in the digital age by showing that ICT enhances firms' FDI strategy. Our findings will help firms to determine the impact of ICT on how quickly, where, and through which activity they should undertake FDI. We expect that ICT changes FDI scope, which is measured as the investment volume or the jobs created at a host location, and fundamentally changes the speed and location dispersion of FDI activities. Figure 8 presents our conceptual model and our hypotheses.

Figure 8: **Conceptual Model**



2.1 ICT and FDI Scope

One of the most critical strategic decisions in international expansion is investment size and commitment in a foreign country. This decision strongly impacts organizational control, investment risk, and its associated returns (Zhao, Luo, and Suh, 2004; Song, 2014; Claussen, Essling, and Peukert, 2018). Rooted in the transaction cost economics literature, investment size reflects a firm's commitment and risk taking in its foreign expansion. Transaction costs result from adaptation to foreign environments, performance monitoring, and safeguarding against opportunistic behavior (Zhao et al., 2004). The underlying objectives are to minimize transaction costs and to maximize returns (Vermeulen and Barkema, 2002). The central argument in transaction cost research is to create cost minimization through mechanisms of exchange (Geyskens, Steenkamp, and Kumar, 2006). If the risk is low, a rational firm would prefer market-governed structures in order to keep transaction costs low. If the risk is high, a rational firm would increase its investments to safeguard the associated risk and the return option. We argue that ICT reduces transaction costs and therefore enables firms to decrease their FDI size and leave more control to the market while keeping the return options at a similar level than their less ICT intense counterparts. ICT reduces transaction costs for three main reasons.

First, ICT has the potential to manage the liability of foreignness and outsidership (Coviello et al., 2017). Reducing the liability of foreignness results from ICT-enabled opportunities engaging with

individuals and firms around the globe at almost zero costs before investing in a foreign location (Jacobides and Hitt, 2005). Thus, ICT-intense firms can adjust their operations to local challenges and thus decrease the risk of future transaction costs. Chen and Kamal (2016) found that ICT reshapes firms' boundaries by decreasing the transaction costs of foreign operations. Furthermore, empirical research has shown that ICT supports MNEs in offering digital products that can be personalized to cultural preferences without significantly adjusting the original product (Boudreau, Loch, Robey, and Straud, 1998; Sambharya, Kumaraswamy, and Banerjee, 2005; Brynjolfsson, Geva, and Reichman, 2016). Such advantages will help firms to safeguard problems that arise from the liability of foreignness before undertaking FDI.

Second, ICT reduces the monitoring costs of international expansion. Chen and Kamal (2016) showed that ICT increases the enforceability of contracts, which support FDIs by reducing transaction costs in a foreign country. Recent research has provided empirical evidence that in particular applications such as enterprise resource planning systems (ERP) help firms to consolidate multiple information sources and location-independent activities into a unified system (Finnegan and Longaigh, 2002). Such technology-enabled systems help firms to retrieve information about sales, production, orders, machine failures, stocks, and other metrics such as human resources and any other organizational aspect in real time (Drnevich and Croson, 2013; Alcácer et al., 2016; Coviello et al., 2017). Such advantages enhance MNEs' ability to ensure a common understanding of business processes in multiple geographic locations while reducing the risk of misunderstanding. We argue that such ICT-based systems enable firms to coordinate their foreign operations more efficiently due to higher monitoring capabilities.

Third, the opportunistic behavior of foreign stakeholders (i.e., subsidiaries) can be reduced by ICT. On the one hand, as mentioned, this is due to advanced monitoring capabilities. On the other, this results from increasing the CEO's ICT-enabled control. Bloom et al. (2014)'s empirical results showed that ICT intensity increases both the HQ's and the CEO's span of control. Span of control increases transparency and centralizes control. Such advantages help MNEs to reduce transaction costs arising from opportunistic behavior. Thus, we expect FDI scope to decrease due to more efficient control mechanisms.

We argue that ICT reduces transaction costs, thus enabling firms to rely more on market-governed mechanisms, which lower FDI scope. Thus, firms can achieve similar returns from their foreign expansion at lower investments. The free cash might be used to increase expansion speed or enter new geographic locations.

Hypothesis 1. The higher the ICT intensity, the lower the FDI deal size.

2.2 ICT and FDI Speed

One key aspect of international business strategy is speed of international expansion. Speed balances firms' resources and international opportunities (Chetty et al., 2014). Starting with Hymer (1960), research has long investigated the factors impacting firms' FDI behavior. Kogut and Chang (1991) found that intangible assets positively correlate with FDI speed. Transferability of assets is a key enabler of FDI speed. Other research, however, has argued that FDI is an incremental process in which

MNEs benefit from prior experience (Zeng, Shenkar, Lee, and Song, 2012). This research stream assumes that gradual investment behavior increases MNEs' learning and commitment incrementally. Consequently, firms maximize the benefits of learning and reduce the risk of failure.

Such studies have emphasized the sequence of FDI deals rather than the speed of FDI deals per se. Following Chang and Rhee (2011), we argue that sequence and speed are independent factors of FDI behavior. We focus on FDI speed because MNEs' sequential behavior is well established in the international business literature (e.g., Johanson and Vahlne (2009); Coviello et al. (2017)). We define FDI speed as the number of FDI deals per year over a period of three years. Undertaking multiple FDI deals per year (high FDI speed) increases transaction costs. Managerial and administrative costs increase with the amount of FDI deals. Under such conditions ICT can support firms to distribute information among local providers. Amazon builds heavily on ICT to distribute and exchange information among its regional offices. Given the asset light nature codified information of business activities, ICT enables firms to increase FDI speed by reducing the transaction costs (Wu and Gereffi, 2018). We argue that established firms can use similar mechanisms to increase FDI speed. ICT helps MNEs to overcome such challenges for two main reasons.

First, international management studies have shown that growing FDI activity increases managerial costs and the need for uncertainty evaluation and coordination (Brouthers, 2002). The faster MNEs undertake FDIs, the higher the demand for labor coordination, search costs, and communication and collaboration in the target location (Banalieva and Dhanaraj, 2013). Thus, transaction costs increase and hamper the speed of further FDIs. Recent MIS research and international business scholars have proposed that ICT strongly impacts transaction cost drivers (which hamper internationalization), such as search costs (Afuah, 2003), communication and collaboration (Bloom et al., 2014), or the nature of FSA in international business itself (Banalieva and Dhanaraj, 2019). We argue that ICT decreases the transaction costs hampering FDI speed for two main reasons. First, ICT enhances information exchange ex-ante and ex-post investment. Ex-ante ICT can support firms to create an almost transparent market in terms of price levels and customer behavior. Price-search agents, for instance, can deliver important information at almost zero costs. Price-search agents are digital shop bots that examine prices at hundreds or thousand stores in a certain country or region at very small search costs (Drnevich and Croson, 2013). This, in turn, creates almost transparent markets at very low costs for a firm and enhances decision making. Thus, the evaluation of uncertainty can be significantly reduced in less time than counterparts lacking such digital capabilities (Alcácer and Chung, 2014). Second, other MIS scholars have argued that internal and external information exchange can be significantly reduced by ICT. This, in turn, helps MNEs to speed up their FDI. Bloom et al. (2014) analyzed European and US-based manufacturing and found that better ICT, such as ERP systems, increases the span of control at significantly lower communication costs. As outlined, the higher the speed of FDI, the higher the coordination costs that hamper FDI speed. ICT centralizes knowledge and distributes information. Both factors enhance decision making and coordination (Alcácer et al., 2016; Mudambi et al., 2018). Thus, we conclude that ICT intensity positively impacts FDI speed.

Second, the higher the FDI speed, the lower the learning from prior FDI deals. This effect is leveraged by the liability of foreignness, which exists if firms expand to foreign countries. Liability of foreignness describes the lack of knowledge of a foreign country's culture and institutions (Rugman

and Verbeke, 2004; Johanson and Vahlne, 2009). Barkema and Drogendijk (2007) argued that incremental internationalization helps MNEs to overcome liability of foreignness by mitigating future risks based on previous learning. FDI at accelerated speed makes it difficult to absorb key learnings, which reduce the liability of foreignness in future FDIs (Chang and Rhee, 2011). The advantage of learning in internationalization strategy is well documented by the Upsalla Model and related work (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017). The underlying assumption is that MNEs increase their commitment (i.e. investment volume) to foreign markets once sufficient knowledge has been acquired. We argue that ICT supports MNEs in their organizational learning process and thus speeds up the FDI process. Organizational learning includes knowledge about structures, routines, or procedures that interact with employees for the purpose of knowledge management (Friedman, Lipshitz, and Popper, 2005). MIS research outlines the essential role of IT-based knowledge management systems. Such systems help firms to distribute knowledge across space at relatively low costs (Hong, Easterby-Smith, and Snell, 2006; Ravichandran, Han, and Mithas, 2017). The advantages resulting from ICT-supported knowledge management will help the firm to overcome the transaction cost challenges arising from FDI speed and to enhance the firm's standing in a competitive business environment (Sambamurthy, Bharadwaj, and Grover, 2003). Iyengar, Sweeney, and Montealegre (2015) empirically investigated the role of ICT in knowledge transfer effectiveness and absorptive capacity, two factors central to FDI speed. On the one hand, transfer effectiveness describes the interplay and exchange between two entities such as group, teams, or organizations in different countries (Alavi and Leidner, 2001). Knowledge transmission and management are key to both organizational learning and FDI speed (Coviello et al., 2017). Knowledge transfer is especially relevant for FDI speed because it increases learning from one FDI deal and reduces the risk of failure of future FDIs. On the other hand, absorptive capacity refers to the communication system between the sender and the receiver Iyengar et al. (2015). Thus, ICT can reduce the effort of interpreting and synthesizing diverse information in order to generate new insights at multiple levels of an organization during fast expansion (Alavi and Leidner, 2001; Pavlou and El Sawy, 2006; Bharadwaj et al., 2013; Drnevich and Croson, 2013) In sum, we expect that ICT positively affects FDI speed.

Hypothesis 2. The higher the ICT intensity, the higher the FDI speed.

2.3 ICT and FDI Location Dispersion

Extant research in economic geography has identified the impact of ICT on firms' location behavior (Alcácer and Chung, 2014; Li and Bathelt, 2018). In the early 2000s, Leamer and Storper (2001) already predicted that "The internet will have more dramatic effect on economic geography than previous rounds of innovation, somehow suspending the force for agglomeration by allowing remote coordination of new and innovative activities" (Leamer and Storper, 2001, p. 643). Recent international business studies have started to zoom in (i.e., Arregle, Miller, Hitt, and Beamish (2016)) and have highlighted the importance of ICT in the context of location dispersion and agglomeration (Alcácer et al., 2016; Chen and Kamal, 2016; Mudambi et al., 2018).

Recent studies, focusing on intranational geographic regions, have gone beyond the country level to examine MNEs' location behavior (Mudambi et al., 2018). Li and Bathelt (2018) analyzed

the FDI behavior of Canadian and Chinese firms. Li and Bathelt combined economic geography and international business research to explain cluster effects of firms. The results show that cluster-of-origin effects are more important than country-of-origin effects for firms' investment choices in clusters (Li and Bathelt, 2018). We do not focus on the home and host location effect but pursue the focus on intranational effects. Howells and Bessant (2012) argued that for MNEs, which are by definition multi-location entities, distribution, coordination, and control of geographically dispersed activities are key sources of competitive advantage. In line with Howells and Bessant (2012), we argue that ICT enhances the location dispersion of FDIs for two main reasons.

First, firms gain competitive advantage from combining local knowledge sourcing and global knowledge integration (Alcácer et al., 2016). On the one hand, firms need to use specialized knowledge centers to access a highly skilled workforce and to benefit from their competitors' knowledge spillover to remain internationally competitive (Cantwell and Salmon, 2018; Mudambi et al., 2018). Economic geography research refers to the location quotient to identify such knowledge hubs. The location quotient measures the industry density of a certain location. The quotient computes the industry's share of regional employment compared to its country-level share of employment (Turkina and Van Assche, 2018). This enables identifying geographic knowledge hubs (e.g., Silicon Valley for IT, Basel for pharmaceuticals, Stuttgart and Munich for the automotive sector, while biotechs would choose Boston, San Francisco, and San Diego (Coombs, Mudambi, and Deeds, 2006; Mudambi et al., 2018)). For a detailed overview of global knowledge clusters, see Turkina and Van Assche (2018, p.714). On the other hand, MNEs must distribute, coordinate, control, and channel the knowledge of such local hubs to their global consumer base in order to facilitate growth. Chen et al. (2019) highlighted that ICT is changing internationalization and knowledge transfer. ICT-enabled business processes transform and revolutionize internationalization (Coviello et al., 2017). Research on business firms has focused on participation and customer-firm exchange. Some scholars have even argued that internationalization is no longer unilateral or manager-led, but relies instead on information exchange (Chandra and Coviello, 2010). In both cases, ICT might help to reduce the associated internal and external transaction costs. Thus, ICT supports the location dispersion of FDI deals. Such advantages will help MNEs to increase their ability to benefit from foreign, location-specific advantages.

Second, previous research has provided theoretical and empirical evidence that ICT increases information distribution. ICT and its transmission channels enable firms to use knowledge management systems. Such systems help firms to distribute knowledge across space at relatively low costs. Knowledge systems contain repositories that comprise upstream and downstream knowledge about business processes and connect professionals within firms (Hong et al., 2006; Ravichandran et al., 2017). Moreover, such IT systems expand the frequency, speed, and volume of the data that MNEs can extract, input, share, and store across the firm (Finnegan and Longaigh, 2002). ICT further enable personnel to work across geographical and locational boundaries to coordinate business activities (Mithas, Whitaker, and Tafti, 2017). "With the information exchanges available through new technologies, webcasts, email, and skype, firms could access more information and obtain more precision in identifying locations, which will provide the best location combination. The use of big data analysis might facilitate this process" (Hazlehurst and Brouthers, 2018, p.81). Discussing the resulting effect of ICT on IB activities, Chen and Kamal (2016) found that ICT adaption positively

affects the likelihood of geographically dispersed in-house production. This is in line with previous research, which has suggested that ICT tends to increase the geographic dispersion of IB networks (Zaheer and Manrakhan, 2001).

Based on the foregoing discussion, we expect ICT to increase the location dispersion of FDI deals. More formally, we posit the following hypothesis:

Hypothesis 3. The higher the ICT intensity, the higher the location dispersion.

2.4 The moderation effect of market seeking vs. knowledge seeking on FDI behavior

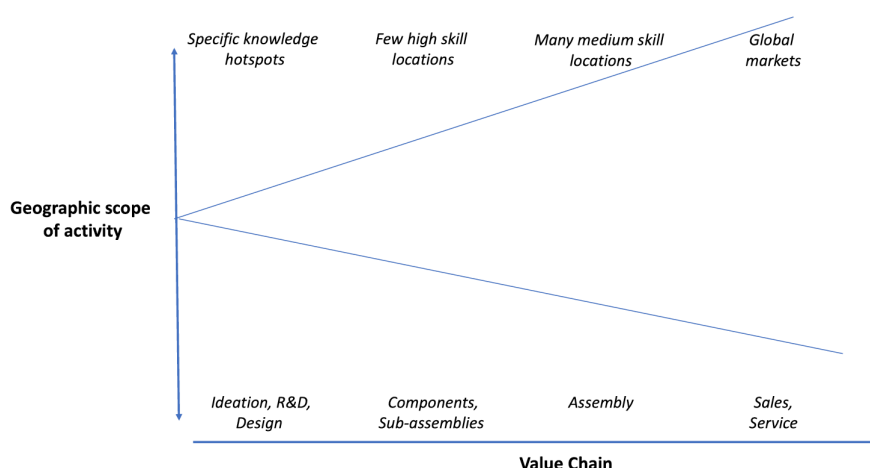
We argue that the relationship between ICT and FDI deal size, speed, and location dispersion highly depends on the firm's FDI motivation. For instance, time-based competitive advantages may emerge from FDI speed for market-seeking FDI activities while knowledge-seeking FDI activities require careful, time-intensive consideration. Consequently, we argue that market-seeking vs. knowledge seeking FDI have a distinct moderating effect on the baseline relationship between ICT and FDI scope, speed, and location dispersion.

Recent international business research and economic geography have enhanced our understanding of how MNEs source and distribute knowledge in a digitized world. MNEs must balance two strategic imperatives. First, they must continually source highly specialized knowledge, which resides in specific locations. Second, they must distribute their products to global markets to generate top-line sales growth and bottom-line profit growth (Mudambi et al., 2018). Integrating ICT into our theoretical understanding of international business and economic geography produces a research framework that encompasses the interaction of strategic FDI motives and the resulting impact on the underlying FDI strategy.

Our central argument is that downstream activities, like marketing and sales, require a presence at the national level while upstream activities, like R&D and Design, are location-independent and can be transferred as codified information. Rugman and Verbeke (2004) highlighted that most of the Fortune Global 500 MNEs have a regional sales orientation. The underlying theoretical explanation is that the transaction costs between home and host region increase with cultural, institutional, and geographical distance. Transaction costs increase mainly due to managerial and administrative costs (Ruigrok, Georgakakis, and Greve, 2013). Recent research has argued that MNEs zoom out when seeking markets whereas they zoom in when seeking knowledge. Figure 9 illustrates the geographic scope of activity along the value chain (Mudambi et al., 2018). This line of argumentation is related to Dunning (1998) strategic imperatives- market- vs. knowledge-seeking activities. Turkina and Van Assche (2018) have empirically shown how value creation has become globally dispersed and which clusters exist.

The different FDI motives impact our three main hypotheses. First, we expect a difference in the moderation effect on FDI scope. On the one hand, market-seeking activities require managerial and administrative investments, thus increasing transaction costs in an international context (Ruigrok et al., 2013; Rugman and Verbeke, 2005). Information about local customer preferences and culture-related activities is difficult to codify and transfer. In contrast, knowledge-seeking activities (e.g.,

Figure 9: Local knowledge vs. Global integration



Source: (Mudambi et al., 2018, p.7)

R&D or design) are easy to codify and transfer across geographical distance. Following this logic, we assume a negative moderation effect of knowledge-seeking activities on the relationship between ICT intensity and FDI scope. Moreover, with market-seeking activities, we expect a negative moderating effect of ICT on FDI scope. This leads to two further hypotheses:

Hypothesis 1a. With market-seeking FDI activities, the negative relationship between ICT and FDI scope becomes less pronounced.

Hypothesis 1b. With knowledge-seeking FDI activities, the negative relationship between ICT and FDI scope becomes more pronounced.

The difference between market- and knowledge-seeking activities also impacts the relationship between ICT intensity and FDI speed. We assume that the positive relationship between ICT intensity and FDI speed is strengthened by market-seeking activities, yet weakened by knowledge-seeking activities. In terms of market-seeking FDI, ICT can provide the necessary knowledge distribution and learning effect to enhance speed. Knowledge systems (Ravichandran et al., 2017) and increasing, knowledge-centralizing monitoring systems (Bloom et al., 2014) are expected to help firms expand faster at relatively low transaction costs. This, in turn, helps MNEs transfer their FSA across geographical locations to capture or create values from imperfect markets (Kirca et al., 2011; Alcácer et al., 2016). With knowledge-seeking activities, ICT enables MNEs to choose from a wider range of location options due to the lower costs of information exchange. Thus, location assessment requires more time due to the larger number of options. This, in turn, requires more assessment time and is expected to result in a negative moderation effect. Consequently, we tested two hypotheses:

Hypothesis 2a. With market-seeking FDI activities, the positive relationship between ICT and FDI speed becomes more pronounced.

Hypothesis 2b. With knowledge-seeking FDI activities, the positive relationship between ICT and FDI speed becomes less pronounced.

Furthermore, we argue that market-seeking activities strengthen the effect of location dispersion while knowledge-seeking activities weaken the relationship between ICT intensity and location dispersion. Internationalization theory scholars have stated that a firm exploits its FSAs across locations until the associated costs outperform the benefits (Buckley, 1988; Kirca et al., 2011; Buckley, 2016). Following this line of argumentation, we suggest that firms can leverage the positive effect of ICT on location dispersion with market-seeking activities. The leveraging effect results from lower transaction costs. We expect a reverse effect for knowledge-seeking activities because ICT enhances the power of knowledge clusters for firms as well as for economic geography (Kemeny and Storper, 2015). Furthermore, recent research has provided empirical evidence that ICT increases the returns from knowledge generation in R&D activities. Ravichandran et al. (2017) found that ICT increases R&D investment returns and that the effect is more pronounced under the condition of geographical distribution. Thus, we expect cities to become more specialized, requiring firms to participate to keep pace with their competitive environment and latest innovations. This leads us to hypothesize:

Hypothesis 3a. With market-seeking FDI activities, the positive relationship between ICT and FDI location dispersion becomes more pronounced.

Hypothesis 3b. With knowledge-seeking FDI activities, the positive relationship between ICT and FDI location dispersion becomes less pronounced.

3 Research Methods

3.1 Sample and Data

Our sample consists of all publicly listed companies from Switzerland, Germany, Netherlands, and the United Kingdom. We have chosen these four countries for three reasons. First, the selected countries serve as the headquarters for the studied internationally listed, globally operating firms. Second, the four countries provide a sufficient level of digital infrastructure on the national level. Such infrastructure is needed for firms to exploit ICT-enabled advantages. Third, all selected countries have leading stock exchanges in the European Union. As of December 31, 2018, and in the five previous years, the Deutsche Börse, Swiss Stock Exchange (SIX), London Stock Exchange (LSE), and Euronext Amsterdam were listed as top exchanges within Europe by domestic market capitalization (Worldatlas, 2018).

FDI data were sourced from the fdi markets database produced by fdi intelligence, a division of the Financial Times Ltd. (Anderson and Sutherland, 2015; Castellani and Lavoratori, 2019). The company tracks cross-border greenfield investments across the world. For firm- level data, we used Thomson Reuters Eikon database and cross-validated the dataset with Bloomberg data. ICT-related variables were sourced from Aberdeen's European database (former Harte Hanks). The

Ci Technology database was produced by Harte Hanks, an international marketing and information company, and today's Aberdeen. Aberdeen collects plant-level data for over 160,000 firms across 20 European countries, and for over 250,000 companies in the US (Bloom et al., 2014). This database is used by leading academic journals to obtain IT-related variables⁹ (e.g. Ray, Xue, and Barney, 2013; Bloom et al., 2014; Kim, Mithas, and Kimbrough, 2017).

In order to investigate FDI strategy, we limited our sample to four criteria. First, we excluded small- and medium-sized companies to ensure a comparable level of FDI activity. We followed the European Union's definition, i.e., "companies with less than 250 staff headcounts, annual revenues of less or equal to EUR 50 million, and total assets of less or equal to EUR 43 million" (European Union, 2017). Second, we excluded joint venture deals and investment cases resulting in less than 50% of post-ownership. This enabled isolating the impact of ICT within a firm and ensuring that the IT strategy applies. If we had also included joint venture investments, we could not have assumed that the company's IT strategy applies to the foreign target, as this would have biased our analyses. The resulting sample consisted of 160 firms and 3565 investments. Third, we excluded pure holding entities or financial investment vehicles by excluding firms with a primary SIC code of 67. By doing so, we also excluded subsidiaries unable to make independent strategic decisions. The resulting sample consisted of 144 firms and 2628 investments. Fourth, we excluded all non-participating firms or ones not fully profiled by Aberdeen. The final sample consisted of 127 firms and 1454 investments.

Several firms invested repeatedly during our study period. For instance, BASF AG invested 121 times. The most popular destinations were Maharashtra and Shanghai¹⁰. Stata 14 was used for all analyses. We applied an ordinary least squares (OLS) regression analyses clustered by firm. We used firm cluster to control for firm-specific effects and controlled for industry, deal type, country, and year. Since hypotheses 1-3 a/b concerned moderation effects, we applied interaction effects for ICT intensity and market-seeking as well as knowledge seeking deals. We also tested the model with fixed effects, following Chang and Rhee (2011). The findings confirmed our results.

3.2 Measures

3.2.1 Dependent Variable

We used three different dependent variables. First, we used FDI deal scope. Following (Rolfe, Ricks, Pointer, and McCarthy, 1993), we measured FDI deal scope as the jobs created in a foreign destination. We also tested our hypotheses by the investment amount in USD. The additional analyses confirmed our findings. Second, we followed Chang and Rhee (2011) by measuring FDI speed as the number of FDIs in the three years prior to the study. Third, we considered the impact of ICT on location dispersion. Following Mudambi et al. (2018), we measured location dispersion by the number of different regional locations, i.e., beyond the national level.

⁹Please see Bloom et al. (2014) for further information about the CiTechnology database.

¹⁰Forty-three investments were made in these two regions in our study period.

3.2.2 Independent Variable

ICT intensity was measured as the aggregated ICT spending on the firm level using employee weights¹¹. Following Devaraj and Kohli (2003), we lagged ICT intensity by $t - 2$ in the time period. For a time lag $t - 3$, the results are consistent. The variable is not normally distributed, and we thus applied the natural logarithm following Boone, Lokshin, Guenter, and Belderbos (2019).

3.2.3 Moderator

Fdi markets report the type of deal for each deal. We only included deal types that can be clearly categorized to market- or knowledge- seeking activities. We created a dummy for market-seeking activities for the following categories: Customer Contact Center, Education and Training, Logistics, Distribution and Transportation, Maintenance & Service, Sales, Marketing & Support, and Technical Support Center. For knowledge-seeking activities, we created a dummy for the following deal types: Design, Development & Testing, Research & Development, regional Headquarters, and ICT & Internet Infrastructure. By selecting the above, we excluded 30.78% of the available FDI sample. Manufacturing, accounts for 28.65% of the 30.78% excluded FDI deals. We also tested our hypotheses by including manufacturing as a separate moderator. The result confirms our theory and initial analyses (see Appendix).

3.2.4 Control Variables

To control for differences due to size differences among the sampled companies, we included firm size as a control variable. This is important for two reasons. First, ICT intensity might be impacted by firm size. Second, FDI activity might impact firms' FDI deals size, speed, and location choice. We measured firm size as the total number of employees. As the variable was not normally distributed, we used the natural logarithm (Boone et al., 2019). We expected that the home country might also impact firms' FDI behavior. On the one hand, the need for FDI depends on the size of the home market. For instance, Switzerland and the Netherlands are relatively small markets compared to Germany or the United Kingdom. On the other hand, as indicated by Alcácer et al. (2016), firms can be biased by their home country in their ICT and digitalization activities. Thus, we included dummies for the four countries in our sample to control for such country-driven impacts. Furthermore, we included dummy variables for one-digit SIC codes to control for industry-specific differences. Research & Development intensity was measured as the ratio of R&D spending to total sales (Belderbos et al., 2018). R&D spending reflects a firm's innovation power, which might impact its FDI behavior. Financial leverage was measured as the ratio of long-term debt to total capital. This impacts the dependent variable because international growth is more likely to be financed by equity than debt (Belderbos et al., 2018). Following Kogut and Singh (1988), we included cultural distance as a control variable. Beugelsdijk et al. (2018a) highlighted the role of cultural distance in international business. Cultural distance between the home and host market significantly increases transaction costs (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017; Rugman and Verbeke, 2004, 2005). Thus, we included cultural distance to isolate the impact of ICT intensity and the

¹¹For a detailed overview of the used measurements, see Sabherwal and Jeyaraj, 2015

moderators. We used Hofstede's four cultural dimensions: individualism-collectivism, uncertainty avoidance, power distance, and masculinity-femininity (Hofstede, 1980).

$$KSIndex = \sum_{i=1}^n \{(I_{ij} - I_{iHome})^2 / V_i\} / N$$

where I_{ij} refers to the mean score on Hofstede's i th cultural dimensions of the host country. I_{iHome} refers to the country's mean score on the respective Hofstede dimension. V_i refers to the variance of the i th dimension. N represents the number of dimensions (Beugelsdijk, Ambos, and Nell, 2018b).

4 Results

Table 14 presents the correlations between and the descriptive statistics of all the variables included in this study. Table 15 shows the regression results, which include three dependent variables. In the columns Scope 1-3, we analyzed the impact of ICT on FDI scope. In the columns Speed 1-3, we used FDI speed as a dependent variable. The columns Location Dispersion 1-3 focused on location dispersion as a dependent variable. We followed the same process with all three categories. First, we analyzed the baseline model in Model 1. Second, in Model 2 we tested the main effect of ICT on the dependent variable. Third, in Model 3 we tested the interaction effects of market-seeking vs. knowledge-seeking investments. We tested our models for multicollinearity by using the variance inflation factor (VIF) based on OLS regression. The mean VIF was 2.20. The highest score was firm size at 1.43. All other diagnostic tests of our full model are in line with OLS assumptions. We identified no violations of normality and linearity.

Table 14: **Descriptives and Correlation**

	Mean	s.d.	Min	Max	Deal size	Speed	Location dispersion	Cultural distance	Return on Assets	Research & Development	Firm size	Financial Leverage	ICT intensity
Deal size	159.28	338.17	0	3000	1								
Speed	18.44	20.16	1	69	-0.00227	1							
Location dispersion	14.33	14.95	1	52	0.000440	0.993*	1						
Cultural distance	1.69	1.30	0	7.55	0.0919*	-0.0481*	-0.0465*	1					
Return on Assets	5.52	5.33	-33.9	37.78	-0.00539	-0.140*	-0.126*	0.0415*	1				
Research & Development	2.05	4.20	0	22.68	0.0502*	-0.208*	-0.203*	-0.00322	0.206*	1			
Firm size	11.02	1.72	5.52	13.36	0.114*	0.684*	0.689*	-0.0308	-0.145*	-0.0765*	1		
Financial Leverage	0.221	.133	0	0.840	0.140*	-0.251*	-0.240*	-0.0144	-0.252*	-0.000883	-0.0146	1	
ICT intensity	6.76	1.15	4.09	9.61	-0.110*	0.260*	0.227*	-0.0672*	0.0881*	0.00655	0.211*	-0.162*	1

* $p < 0.05$

In Table 15, we first tested hypothesis 1 as well hypothesis 1a and hypothesis 1b in the model "Scope 1–3." We tested hypothesis 1, which suggests that ICT negatively impacts FDI scope, in the model "Scope 2." The result does not support our hypotheses. The effect is not negative and not significant (2.51, $p > 0.10$). Hypothesis 1a predicted a negative moderation effect for market-seeking activities. We found a significant different effect (-36.85 , $p < 0.05$). Thus, hypothesis 1a is supported. Our results for hypothesis 1b, which predicted a more pronounced negative moderation

effect for knowledge-seeking FDI activities, is not supported (32.23, $p > 0.10$). The moderation plot “Scope” in Table 16 illustrates the relationship with confidence intervals at 95%. Based on the plot, we conclude that there is no significant difference between market seeking and knowledge seeking as the confidence intervals overlap. Thus, we did not distinguish the moderation effects graphically either. In the model “Speed 1–3,” we tested our hypotheses about FDI speed. In the model “Speed 2,” we tested the direct effect of ICT on FDI speed. The result indicates a slight negative relationship, yet is not significant (-0.50 , $p > 0.10$). Thus, hypothesis 2 is not supported. Hypotheses 2a suggested a positive moderation effect for market-seeking activities. The result, model “Speed 3,” is positive but not significant (1.88, $p > 0.10$). Thus, hypotheses 2a is not supported. Hypothesis 2b, which assumed a negative effect moderation effect for knowledge-seeking FDI, significantly aligns with our expectations (-1.08 , $p < 0.05$). Thus, hypothesis 2b is supported. The different moderation effects are illustrated by the moderation plot “Speed” in Table 16. The confidence intervals do overlap at low level of ICT intensity, later the two confident intervals do not overlap. Thus, we conclude that hypotheses 2b is fully supported. In the models Location dispersion 1-3 we tested our hypotheses about location dispersion. In the model “Location Dispersion 2,” we tested the baseline hypothesis, which suggests a positive effect. The results show a slight, yet insignificantly negative effect (-0.44 , $p > 0.10$). Hypothesis 3a, which assumed a positive moderation effect for market-seeking activities, is highly significant (1.36 $p < 0.10$). Thus, hypothesis 3a is supported. Hypotheses 3b suggested the opposite effect for knowledge-seeking activities, i.e., more location concentration for knowledge-seeking FDI. The results for hypothesis 3b in the model “Location Dispersion 3” are significant and align with our expectations (-0.87 , $p < 0.05$). The graphical moderation plot in Table 16 confirms our OLS results. The confidence intervals do overlap at low levels but are separated for medium and high level of ICT intensity, leading us to conclude that hypotheses 3a and 3b are fully supported.

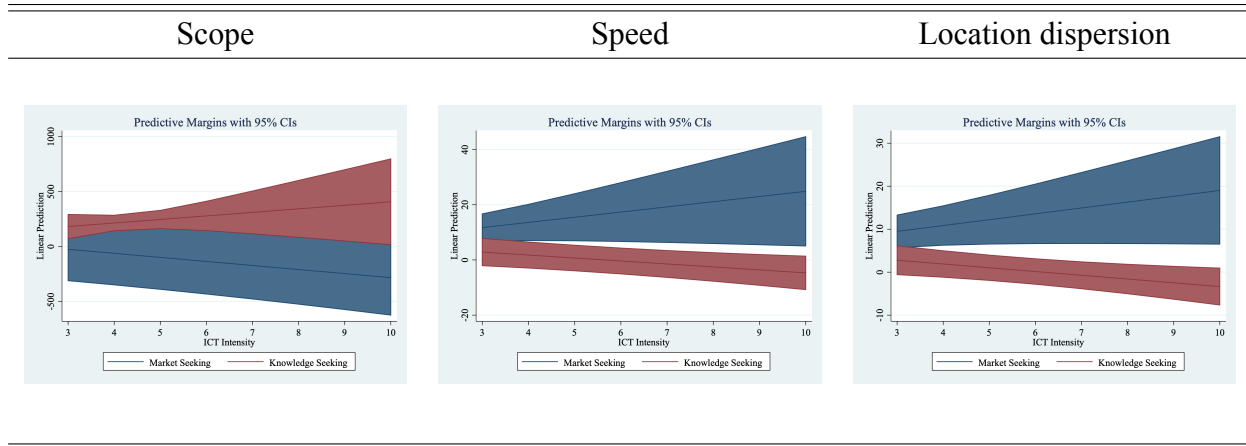
Table 15: Regression Results

	Scope 1		Scope 2		Scope 3		Speed 1		Speed 2		Speed 3		Location dispersion 1		Location dispersion 2		Location dispersion 3	
Cultural distance	25.80 [†]	(13.23)	28.45*	(13.04)	30.19*	(12.84)	0.513 [†]	(0.289)	0.477	(0.296)	0.301	(0.332)	0.431 [†]	(0.224)	0.412 [†]	(0.229)	0.273	(0.253)
Return on Assets	0.490	(1.255)	0.490	(1.433)	-0.956	(1.820)	0.0607	(0.0561)	0.0665	(0.0637)	0.0423	(0.0722)	0.0504	(0.0438)	0.0563	(0.0493)	0.0404	(0.0551)
Research & Development intensity	5.666	(5.116)	6.143	(5.145)	4.952	(5.168)	-0.0804	(0.104)	-0.0810	(0.114)	-0.0987	(0.123)	-0.0692	(0.0813)	-0.0659	(0.0892)	-0.0710	(0.0952)
Firm size	19.87***	(5.825)	19.83**	(6.729)	19.01 [†]	(9.856)	2.106***	(0.582)	2.215***	(0.580)	2.607***	(0.578)	1.633***	(0.446)	1.724***	(0.449)	1.990***	(0.437)
Financial Leverage	-189.6	(152.3)	-178.2	(146.9)	-322.0 [†]	(166.1)	-3.313	(4.258)	-3.369	(4.190)	-2.843	(5.126)	-2.784	(3.239)	-2.808	(3.183)	-2.129	(3.892)
Country Dummy	included in all models																	
Industry Dummy	included in all models																	
Deal Type Dummy	included in all models																	
Year Dummy	included in all models																	
ICT Intensity			2.510	(20.91)					-0.502	(0.436)					-0.440	(0.341)		
Market Seeking × ICT Intensity					-36.85**	(13.43)					1.877	(1.204)					1.362 [†]	(0.761)
Knowledge Seeking × ICT Intensity					32.23	(33.96)					-1.077**	(0.405)					-0.875*	(0.343)
Constant	-109.1	(81.19)	-127.2	(113.9)	449.3*	(197.6)	-17.29**	(5.802)	-15.77*	(6.762)	-42.86**	(13.48)	-13.09**	(4.324)	-11.69*	(4.866)	-31.95***	(8.925)
Observations	1454		1433		782		1454		1433		782		1454		1433		782	
R ²	0.219		0.221		0.191		0.421		0.432		0.491		0.419		0.431		0.488	
Adjusted R ²	0.128		0.124		0.074		0.354		0.362		0.418		0.352		0.361		0.415	

Standard errors in parentheses

Source: Camillo Werdich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 16: **Moderating Effects**

5 Discussion and Conclusion

We explored the impact of ICT on FDI deal scope, speed, and location dispersion. We gave special attention to the difference between market-seeking and knowledge-seeking FDI, not least because previous research has ignored this important distinction (Mudambi et al., 2018). We addressed the lack of nuanced understanding of how ICT affects firms' international business strategies. Our results show that while ICT does not change FDI deal scope, which is measured as the investment volume or the jobs created at a host location, it fundamentally changes the speed and location dispersion of FDI activities. Thus, with ICT, firms use the same investment volume, but change their FDI strategy.

To understand these strategic differences, we investigated the impact of market-seeking and knowledge-seeking moderators on our three dependent variables. We predicted that ICT decreases FDI deal scope by reducing transaction costs ex-ante and ex-post FDI. Interestingly, we found no statistical support for our first hypothesis. Nor did we find a significant moderation effect of market-seeking and knowledge-seeking FDI objectives on the relationship between ICT and deal scope. The results can be explained by two reasons.

First, MIS literature highlights that ICT requires additional investments upfront. Thus, the net benefit will be reduced in the first place. However, once a system is implemented it carries out processes for free (Cordelia, 2006). In the context of FDI, such initial setup costs might increase the deal scope in the first place and pay off after successful implementation. Devaraj and Kohli (2003) argued that the time until ICT has a positive effect varies by industry and application. In our dataset, we were unable to measure the long-term performance of FDI. Accordingly, we were unable to isolate this potential effect in our analyses. As a result, our proxy for deal scope might be inflated by the long-term reduction in transaction costs. This inflation would might explain the overlapping confidence intervals in the moderation plot (see table 16 – Scope). Potential improvements for further research will be discussed in the limitations below.

Second, the nonsignificant effect might result from lacking managerial capabilities or attention. Bharadwaj et al. (2013) argued that IT strategy should be a functional strategy and close to the CIO's responsibilities. The digital transformation process must have a clear governance structure and be

supported by top management. Mithas et al. (2017) found that top management and board attention are key success factors for profitability in the context of ICT implementation. The influence of the top management team is well documented in upper echelons theory (see Hambrick and Mason (1984), Hambrick (2007)). Following upper echelons research, firms might differ in their ability to recognize, internalize, and exploit knowledge in such transformation processes (Sabherwal and Jeyaraj, 2015). As FDI decisions take place in an organization's upper echelons, ICT knowledge might have strongly impact FDI behavior. If the top management lacks sufficient ICT knowledge, it might not change its investment behavior. This, in turn, explains the nonsignificant effects and the broad confidence intervals due to high variation of top management team expertise.

Our research contributes to the international business literature in three ways. First, our findings support the suggestion of recent international business scholars that ICT enhances internationalization (Alcácer and Chung, 2014; Coviello et al., 2017). On the one hand, our results provide empirical evidence that ICT enhances the speed of market-seeking activities. The advantages of increased speed help firms to capture and create more value from imperfect foreign markets and thus ensure growth (Kirca et al., 2011; Chang and Rhee, 2011). On the other hand, our results show that combining ICT with knowledge-seeking activities enhances the specialization of local knowledge centers. Our results are consistent with Mudambi et al. (2018)'s theoretical perspective on local knowledge sourcing and global knowledge integration. Hence, we confirm Banalieva and Dhanaraj (2019)'s suggestion that FSA advantages result from information exchange rather than from the concept of places and physical assets.

Second, our empirical results show that ICT fundamentally changes the concept of physical places. On the hand, our findings show that ICT combined with market-seeking activities increases FDI regional dispersion within a country. In other words, our results indicate that geographical closeness to customers still matters for marketing activities while location dispersion for knowledge seeking decreases. Regarding knowledge-seeking activities, our results thus support greater knowledge specialization of certain cities, for instance, San Francisco for IT-related innovation (Mudambi et al., 2018).

Third, taken together, our results suggest that there is no simple answer to the question about how ICT affects FDI behavior. Rather, our results highlight the importance of considering the differences between market-seeking and knowledge-seeking objectives. ICT increases specialization while enhancing firms' global positioning. We therefore recommend a careful interpretation of ICT in international business and underscore the importance of rigorous research design and assessment.

Beyond its academic relevance, this paper has several managerial implications. Our findings indicate that firms can reduce transaction costs for FDI speed and location choice decisions by using ICT. This can be a valuable strategy for late-internationalizing firms (e.g., startups from China or other emerging markets). Such managers must find ways to rapidly internationalize to keep pace with other global and local competitors. Thus, our study provides important insights for managers. First, ICT helps to source important localized knowledge and secondly it helps to distribute this knowledge globally at lower transaction costs. In addition, our empirical results can support the managers of established firms in better balancing market-seeking and knowledge-seeking activities. Overall, we are confident that our findings will help firms to determine the impact of ICT on how quickly, where, and through which activities they should undertake FDIs.

6 Limitations and further research

This study has several limitations, which open up avenues for further research. First, the measurement of deal scope does not capture the associated benefits of ICT. It only covers investment size in Euros or the jobs created in the host location on day one. The regression results indicate a negative relationship between ICT and deal scope, as expected for hypothesis 1 ($p < 0.10$). However, we found no statistical support for hypotheses 1a and 1b. Data availability limited our research in terms of a time series analysis for performance effects on the subsidiary level. Thus, our analysis only captures ex-ante transaction costs but not ex-post FDI transaction costs. Future research should gather subsidiary-level data to extend our research to the long-term performance effects of ICT on FDI. This might narrow the confidence intervals for the moderator models and explain more variance in the model. Currently, the adjusted R^2 is 0.15, which is low compared to our other two models (around 0.40).

Second, we limited our research to Switzerland, Germany, the Netherlands, and the United Kingdom. The sampled companies are all headquartered in developed countries. Further research should focus on firms from emerging countries about to enter global competition. In such a research setting, the resulting effects might be stronger due to the higher need to internationalize at speed and with more location options. This could validate our findings and contribute to emerging markets research.

Third, our ICT measurement, i.e., ICT spending per employee, is merely a proxy for ICT activities and lacks industry-specific profiles. Devaraj and Kohli (2003) argued that ICT effects vary based on industry differences. We controlled for industries, but future research should consider industry-specific ICT variables and focus on a single industry to improve the accuracy of results. The advantage of our proxy is that it enables observing a cross-industry effect.

Fourth, future research might study two specific countries to focus more on the role of regional effects. On the country level, we used regions and cultural distance as a control variable. Beugelsdijk et al. (2018a) showed that recent research highlights intra-country cultural distance. This, in turn, would further improve such studies and contribute to understanding regional distance and firms' FDI location choices. In addition, we assumed that cultural distance is stable over time. However, existing research suggests that on the country level, and even on the regional level, culture changes over time. Such dynamics have been not taken into account in this study, but might be a valuable avenue for further research to pursue (Fernandez, Carlson, Stepina, and Nicholson, 1997; Inglehart, 1997; Beugelsdijk and Welzel, 2018).

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7 Appendix

7.1 Additional Analysis - Robustness Test

Table 17 shows that we tested our hypotheses under the conditions of co-location, expansion, or new investment as an additional robustness test. The results are in line with our initial analysis. Based on the analysis and the moderating plots, we conclude that the robustness test supports our results. Table 18 presents the moderation plots.

Table 17: Robustness Test

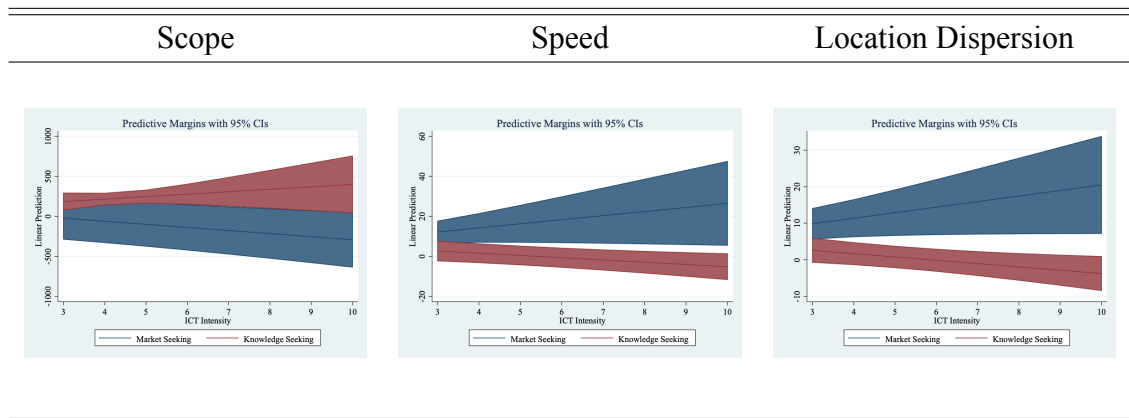
	Scope 1		Scope 2		Scope 3		Speed 1		Speed 2		Speed 3		Location dispersion 1		Location dispersion 2		Location dispersion 3	
Cultural distance	26.62*	(11.80)	29.65*	(11.65)	31.40*	(12.31)	0.465	(0.299)	0.441	(0.308)	0.182	(0.347)	0.384 [†]	(0.231)	0.373	(0.237)	0.167	(0.261)
Return on Assets	0.128	(1.259)	0.0404	(1.448)	-1.468	(1.973)	0.0624	(0.0567)	0.0680	(0.0650)	0.0438	(0.0712)	0.0510	(0.0441)	0.0567	(0.0501)	0.0402	(0.0539)
Research & Development intensity	5.466	(4.586)	5.904	(4.622)	4.896	(4.819)	-0.0752	(0.101)	-0.0753	(0.111)	-0.0875	(0.120)	-0.0654	(0.0783)	-0.0614	(0.0865)	-0.0617	(0.0924)
Firm size	19.49**	(5.959)	19.95**	(6.776)	19.24 [†]	(9.805)	2.113***	(0.591)	2.218***	(0.586)	2.625***	(0.581)	1.640***	(0.453)	1.727***	(0.453)	2.006***	(0.437)
Financial Leverage	-163.6	(136.4)	-152.0	(133.3)	-295.9 [†]	(154.2)	-3.478	(4.289)	-3.507	(4.231)	-2.808	(5.157)	-2.819	(3.252)	-2.810	(3.205)	-1.981	(3.902)
Country Dummy	included in all models																	
Industry Dummy	included in all models																	
Deal Type Dummy	included in all models																	
Year Dummy	included in all models																	
Co-Location	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Expansion	-148.1	(172.9)	-145.3	(169.8)	-132.8	(159.3)	0.161	(1.886)	0.169	(1.791)	-0.464	(1.799)	-0.177	(1.532)	-0.177	(1.445)	-0.701	(1.461)
New	-164.5	(172.0)	-166.7	(168.5)	-149.4	(153.9)	0.825	(2.192)	0.663	(2.083)	0.823	(2.236)	0.483	(1.746)	0.354	(1.646)	0.461	(1.772)
ICT Intensity			1.954	(19.04)					-0.513	(0.436)					-0.443	(0.342)		
Market Seeking × ICT Intensity					-38.68**	(14.56)					2.046	(1.252)					1.518 [†]	(0.783)
Knowledge Seeking × ICT Intensity					30.58	(30.87)					-1.122*	(0.432)					-0.906*	(0.366)
Constant	51.52	(191.9)	28.92	(151.1)	579.7*	(286.8)	-18.00**	(6.725)	-16.23*	(7.329)	-44.29**	(14.59)	-13.47**	(5.075)	-11.90*	(5.356)	-33.06**	(9.761)
Observations	1454		1433		782		1454		1433		782		1454		1433		782	
R ²	0.232		0.235		0.203		0.421		0.432		0.495		0.421		0.432		0.494	
Adjusted R ²	0.137		0.133		0.079		0.350		0.357		0.417		0.349		0.357		0.416	

Standard errors in parentheses

Source: Camillo Werlich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 18: Robustness Test Moderating Effects



7.2 Additional Analysis - Manufacturing

Table 19 shows that we added an additional category as a moderator to utilize the full sample. The frequency of all deals was distributed as follows. Business services 15.03%, Construction 0.68%, Customer Contact Centers 1.10%, Design, Development & Testing 9.55%, Education & Training 1.48%, Electricity 0.27%, Extraction 0.15%, Headquarters 3.92%, ICT & Internet Infrastructure 2.36%, Logistics, Distribution & Transportation 17.77 %, Maintenance & Servicing 1.48%, Manufacturing 28.65%, Recycling 0.23%, Research & Development 2.05%, Sales, Marketing & Services 13.20%, Shared Services Centers 1.45%, Technical Support Centers 0.61%.

We tested all three models by adding Manufacturing as an additional moderator, see table 19. All results are in line with our initial model. However significant level decreased particularly for knowledge seeking activities. Manufacturing exhibits an negative moderation effect in speed and location dispersion models whereas in scope it is positive. Only the negative moderation effects (Speed and Location Dispersion) were significant ($p < 0.05$). Based on a T-Test we focused more on the relationship between Knowledge Seeking and Manufacturing activities. Based on the T-Test we can conclude that there is no significant difference between the two groups which might bias our results. Thus, we conclude that the exclusion of Manufacturing from our selection process is important.

Table 19: Manufacturing

	Scope 1		Scope 2		Scope 3		Speed 1		Speed 2		Speed 3		Location dispersion 1		Location dispersion 2		Location dispersion 3	
Cultural distance	26.13 [†]	(13.24)	28.78*	(13.06)	31.99*	(14.15)	0.520 [†]	(0.290)	0.485	(0.297)	0.354	(0.336)	0.435 [†]	(0.225)	0.418 [†]	(0.229)	0.320	(0.255)
Return on Assets	0.492	(1.260)	0.506	(1.449)	-0.781	(1.856)	0.0614	(0.0561)	0.0671	(0.0640)	0.0387	(0.0726)	0.0506	(0.0438)	0.0566	(0.0496)	0.0373	(0.0555)
Research & Development intensity	5.679	(5.119)	6.161	(5.148)	4.449	(4.897)	-0.0839	(0.104)	-0.0845	(0.115)	-0.102	(0.127)	-0.0724	(0.0813)	-0.0685	(0.0896)	-0.0714	(0.0974)
Firm size	19.94***	(5.794)	19.98**	(6.697)	21.54*	(9.100)	2.110***	(0.581)	2.214***	(0.580)	2.575***	(0.590)	1.632***	(0.446)	1.720***	(0.449)	1.956***	(0.447)
Financial Leverage	-180.0	(150.8)	-167.7	(145.9)	-318.0 [†]	(173.2)	-3.482	(4.228)	-3.524	(4.172)	-2.942	(5.104)	-2.861	(3.210)	-2.872	(3.161)	-2.135	(3.867)
Country Dummy	included in all models																	
Industry Dummy	included in all models																	
Deal Type Dummy	included in all models																	
Year Dummy	included in all models																	
ICT Intensity			2.468	(20.73)					-0.474	(0.438)					-0.424	(0.344)		
Market Seeking × ICT Intensity					-37.38**	(14.07)					2.088 [†]	(1.216)					1.506 [†]	(0.779)
Knowledge Seeking × ICT Intensity					-8.865	(23.06)					-0.968	(0.830)					-0.793	(0.652)
Manufacturing × ICT Intensity					54.86	(54.42)					-1.141*	(0.450)					-0.928*	(0.404)
Constant	-111.4	(80.76)	-130.8	(113.0)	425.0*	(196.9)	-17.33**	(5.788)	-15.92*	(6.735)	-44.17**	(13.88)	-13.07**	(4.320)	-11.73*	(4.857)	-32.76***	(9.334)
Observations	1454		1433		1206		1454		1433		1206		1454		1433		1206	
R ²	0.220		0.222		0.201		0.422		0.433		0.493		0.420		0.432		0.489	
Adjusted R ²	0.130		0.126		0.083		0.355		0.362		0.418		0.353		0.361		0.413	

Standard errors in parentheses

Source: Camillo Werlich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7.3 Robustness Test - Industry Dynamism

Industry dynamism is an important variable for DOI as introduced in chapter III. However, our empirical results indicate, that industry dynamism does not add additional exploratory power to the model and was not significant in one of the models. Thus, we decided to exclude industry dynamism in order to not artificially inflate the R^2 . We still control for industry as a dummy variable to take industry effects into account. The table 20 below presents more details.

Table 20: Robustness Test Industry Dynamism

	Scope 1		Scope 2		Scope 3		Speed 1		Speed 2		Speed 3		Location dispersion 1		Location dispersion 2		Location dispersion 3	
Industry Dynamism	27.22	(37.76)	19.16	(39.02)	-9.211	(50.59)	0.358	(1.346)	0.763	(1.307)	2.204	(1.504)	0.262	(1.075)	0.629	(1.010)	1.521	(1.137)
Cultural distance	25.87 [†]	(14.74)	28.57 [†]	(14.17)	31.78 [*]	(14.65)	0.574 [†]	(0.322)	0.564 [†]	(0.332)	0.503	(0.381)	0.467 [†]	(0.247)	0.470 [†]	(0.256)	0.428	(0.290)
Retrun on Assets	-0.0791	(1.595)	-0.446	(1.839)	-0.912	(2.145)	0.0361	(0.0697)	0.0629	(0.0819)	0.0459	(0.0826)	0.0310	(0.0538)	0.0539	(0.0628)	0.0462	(0.0630)
Research & Development intensity	4.907	(4.794)	5.084	(4.719)	4.503	(4.965)	-0.0879	(0.107)	-0.0917	(0.119)	-0.119	(0.126)	-0.0759	(0.0852)	-0.0755	(0.0941)	-0.0859	(0.0980)
Firmsize	22.21**	(6.960)	21.44**	(7.411)	16.38	(10.34)	2.294***	(0.645)	2.374***	(0.631)	2.800***	(0.639)	1.786***	(0.496)	1.854***	(0.487)	2.124***	(0.482)
Financial Leverage	-275.5	(172.9)	-263.6	(174.8)	-346.4 [†]	(174.7)	-3.682	(4.787)	-3.608	(4.746)	-3.152	(5.419)	-3.230	(3.648)	-3.155	(3.603)	-2.280	(4.124)
Country Dummy	included in all models																	
Industry Dummy	included in all models																	
Deal Type Dummy	included in all models																	
Year Dummy	included in all models																	
ICT Intensity			7.405	(22.25)					-0.453	(0.492)					-0.393	(0.377)		
Market Seeking × ICT Intensity					-32.57*	(15.29)					1.684	(1.205)					1.210	(0.765)
Knowledge Seeking × ICT Intensity					29.46	(34.27)					-1.005*	(0.403)					-0.820*	(0.335)
Constant	-160.0 [†]	(77.54)	-195.0	(124.1)	227.8	(150.7)	-17.76**	(6.296)	-16.18*	(7.538)	-38.82**	(13.74)	-13.48**	(4.719)	-12.10*	(5.477)	-28.43**	(9.135)
Observations	1454		1433		782		1454		1433		782		1454		1433		782	
R ²	0.172		0.176		0.195		0.442		0.452		0.497		0.441		0.452		0.493	
Adjusted R ²	0.064		0.060		0.066		0.369		0.375		0.416		0.368		0.375		0.412	

Standard errors in parentheses

Source: Camillo Werdich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Part V

FDI Location Choice In The Digital Age: The Changing Role of Cluster

Abstract

This study examines the impact of information and communication technologies (ICT) on FDI location choice of European firms on city-level. We argue that ICT reduces transaction costs and allows firms to choose a host location on a higher degree of freedom. We further show the distinct effect of ICT on the moderating role of FDI activity type (i.e., asset- vs. knowledge seeking) and cultural distance.

Our results show that FDI location choice has changed in the digital age. We found empirical support for a diverging impact of ICT on market- vs. knowledge seeking activities. While for market seeking activities agglomeration remains important, knowledge seeking investments move away from existing clusters. Ultimately, our results suggest the end of the rise agglomeration effects for knowledge seeking activities.

Our analyses are based on a dataset from four major European countries, consisting of 1,288 FDI deals between 2011 and 2015. We contribute to the emerging literature on internationalization in the digital age.¹²

Keywords: Foreign Direct Investment (FDI); ICT; Location Choice; Cultural Distance

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1 Introduction

Location choice for foreign direct investments (FDI) is a key topic in international business. Co-location has been identified as a source of competitive advantage (Alcácer and Chung, 2014). This advantage results from various externalities such as skilled labor, knowledge spillover, or producer linkages (Alcácer and Chung, 2014; Jones, 2017). In recent years, digital innovations have reshaped the global landscape in which firms operate in terms of speed, scope, and location choice (Alcácer and Chung, 2014; Alcácer, Cantwell, and Piscitello, 2016; Brouthers, Geisser, and Rothlauf, 2016; Hazlehurst and Brouthers, 2018). Ultimately, innovations in information and communication technologies (ICT) have been recognized as a neglected factor in the international business literature and might redefine the effect of co-location advantages.

In the early 2000s, Leamer and Storper proposed that “the Internet” will impact economic geography more dramatically than any previous innovations (Leamer and Storper, 2001). Thus, it is barely surprising that the impact of ICT has sparked the interest of MIS researchers (Bharadwaj, 2000; Bloom, Garicano, Sadun, and Van Reenen, 2014), international business scholars (Alcácer et al., 2016; Hazlehurst and Brouthers, 2018; Banalieva and Dhanaraj, 2019), and economic geography research (Santangelo, 2002). On the one hand, the MIS literature has developed a fundamental understanding of the impact of ICT on the project and the functional level within the firm. For example, Bloom et al. (2014) found that ICT positively impacts the centralization of knowledge and control while increasing the effectiveness of employee decision-making. On the other hand, international business scholars have outlined how digitalization reduces transaction costs in international business (Alcácer et al., 2016). Recent studies have suggested that ICT reconfigures the process of internationalization in terms of timing, rhythm, and entry mode choice (Drnevich and Croson, 2013; Coviello, Kano, and Liesch, 2017). In particular, FDI location choice and colocation decisions sparked the attention of international business scholars (Castellani and Lavoratori, 2019).

Their inherent focuses have led MIS research and the international business literature to coexist without informing each other. Consequently, our understanding of the relationship between ICT and co-location strategies remains incomplete. Following Banalieva and Dhanaraj (2019), we argue that the source of FSA shifts from the concept of physical location to the firm’s ability to exchange information. We raise two main questions: “To what extent and in what way does ICT intensity impact the likelihood of foreign direct investments being co-located? And what is the moderating role of cultural distance and business type activities?” We focus on whether cultural distance and the nature of FDI type moderate the likelihood of locating FDI in cities where knowledge clusters¹³ already exist. We retest established international business transaction cost driver, such as the role of cultural distance and FDI activity types in the context of new developments of ICT.

We aim to extend understanding of firms’ FDI location choice decisions in the digital age. We build on previous attempts to link the two disconnected research streams (MIS and international business literature; see Drnevich and Croson 2013 for a detailed comparison). Moreover, we respond to calls for further analyses of a fine-grained geographic unit than the country level (Mudambi, Li, Ma, Makino, Qian, and Boschma, 2018; Beugelsdijk, Ambos, and Nell, 2018b; Hutzschenreuter, Matt, and Kleindienst, 2020). We further agree with Alcácer et al. (2016) that international business, in

¹³We define knowledge clusters as the cumulated number of foreign direct investments made by all firms in a city between 2003 and 2010, following (Castellani and Lavoratori, 2019).

particular the strategy of MNEs, demands "a new conceptualization of location behaviors" (Alcácer et al., 2016, p. 501).

Our central argument is that ICT increases the degree of freedom in choosing locations. We argue that ICT reduces transaction costs and increases information exchange, which combined become more important than physical location. Thus, we expect in general less co-location behavior at a high level of ICT. The proposed relationship will be closer with knowledge-intensive activities than with market-seeking ones. In addition, we expect cultural differences to increase co-location. We argue that information, specifically tacit knowledge, can be transferred at lower transaction costs with ICT. Such advantages can be leveraged by firms to source knowledge seeking activities from locations outside existing agglomerations at lower transaction costs. We further argue that ICT increases co-location for market seeking activities and high cultural distance environments.

Our study makes three contributions to international business research. First, firms can choose from a wider range of location options for knowledge-intensive activities while certain clusters remain strong. In this regard, we contribute to the ongoing discussion on digitalization in the field of international business. Second, by focusing on city agglomerations our analysis extends is more fine grained than previous studies on country level, the hitherto established, yet limited unit. This approach zooms-in and enables more rigorous empirical analysis (Bloom et al., 2014). Third, this paper helps to bridge the theoretical findings of the MIS literature with those of international business research.

2 Theory and Hypotheses

Firms use FDI for two strategic purposes. First, firms internalize knowledge either missing from or imperfect in an external market until the costs offset the returns. Second, firms select the host location based on purely economic factors and aim to minimize overall operational costs (Buckley and Casson, 1976). The diverse geographical distribution of location advantages creates agglomeration effects on the national, regional, or even city level. ICT impacts both knowledge internalization and purely economic factors in the FDI process. Assessing the impact of ICT on the location choices of FDIIs while considering city-level, agglomeration effects affects the benefits and costs of FDIIs and has important implications for international business theory (Alcácer et al., 2016; Mudambi et al., 2018; Hutzschenreuter et al., 2020).

Before determining the impact of ICT on firms' location choices, we need to understand why FDI occurs in the first place. This empirical phenomenon has been studied in multiple literature streams: economics, urban studies, strategic management, economic geography, management, and international business (Nielsen, Asmussen, and Weatherall, 2017). Economists have focused mainly on the economic interactions between countries, regions, or even cities. Drawing on classical trade theory (see the early work of Ricardo 1817 and Ohlin 1935), economists explain which external and internal factors of a firm attract specific types of FDI. Recent publications, focusing on the spatial behavior of MNEs, have followed the arguments of traditional location theory, which suggests that firms need to achieve economies of scale and reduce transportation and production costs (Alcácer et al., 2016).

International business scholars have focused more on managerial issues in seeking to explain FDI. Liability of foreignness (LOF), which describes the additional costs of doing business abroad (Hymer, 1960; Vahlne and Johanson, 2017), has been a major trend in international business in explaining firms' FDI behavior and location choice. Cultural distance and institutional distance have been understood as cost drivers (Verbeke and Asmussen, 2016; Beugelsdijk et al., 2018b; Beugelsdijk, Kostova, Kunst, Spadafora, and van Essen, 2018a). Overall, international business literature argues that FDI only occurs if exploiting foreign locations results in superior performance despite additional administrative and managerial costs due to LOF. In particular, the imperfect external markets for intermediate goods cause enforcement, monitoring, and information asymmetries that result in transaction costs (Nielsen et al., 2017).

International business and economic geography have highlighted the location advantages arising from agglomeration economies. Proximity reduces the costs of accessing specialized inputs such as skilled labor while enabling knowledge spillovers (Alcácer and Chung, 2007; Mariotti, Mutinelli, Nicolini, and Piscitello, 2015). Recent international business research has identified three main reasons that affect firms' location choices. First, Nachum, Zaheer, and Gross (2008) identified that location choice heavily depends on both the connectivity and the openness of the host location. Global cities (e.g., Zurich, Amsterdam, New York, London, or Shanghai) help firms to overcome the liability of foreignness (Goerzen, Asmussen, and Nielsen, 2013). In particular a city's social and economic characteristics attract foreign FDI. These characteristics include connectivity to global and local markets, uncertainty, and reduced legitimacy in foreign markets.

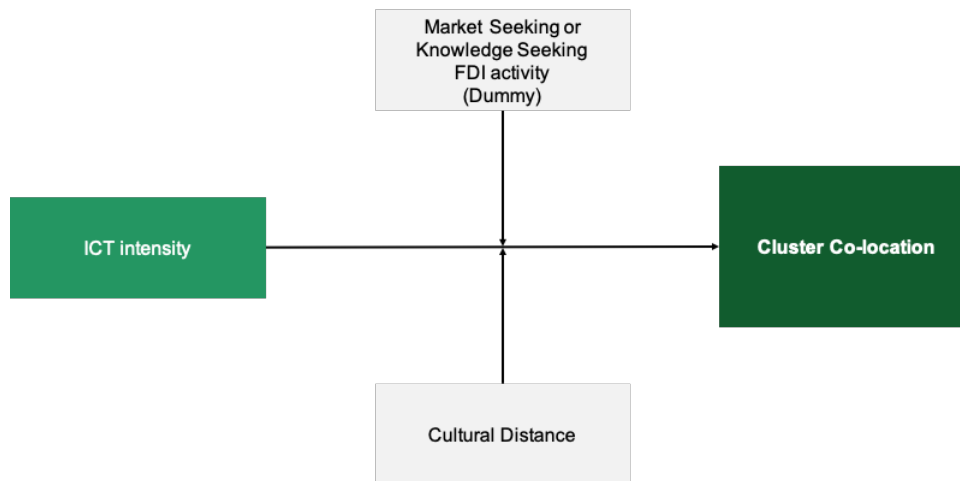
Second, the latest research shows that the host city plays a key role in location choice. Alcácer et al. (2016) argued that cities more successfully attract FDI if they are located in countries that are well-connected and that provide a high quality of life (e.g., Toronto, Amsterdam, Munich, Zurich, Vienna). Interestingly, firms from emerging markets tend to choose their FDIs based on a broader set of criteria. Alcácer et al. (2016) found that FDIs from emerging markets are more locally diverse than from developed countries, which prefer well-connected places with a reputation for high quality of life.

Third, specific co-location patterns co-evolve in global cities. Goerzen et al. (2013) reported different patterns for demand-driven, market-seeking, and market-serving types of activity. Global cities, which provide access to a larger customer base, attract more sales and distribution types of FDIs. Supply-driven, asset-seeking, and efficiency-seeking activities, such as research and development, tend to be located outside city clusters. This, in turn, increases the co-evolution of firms' location strategy and the specific emergence of local knowledge centers for particular activities along the value chain.

We follow those international business scholars who argue that superior knowledge and information access reduce transaction costs and impact FDI location choice. Thus, we focus on co-location behavior rather than also assess city attractiveness or country-specific impact factors. Most recently, Banalieva and Dhanaraj (2019) have shown that the previous advantages of physical location are shifting toward the ability to exchange information. The underlying argument is that firms can leverage ICT to minimize the transaction costs arising from the firm's geographical space. We follow this line of argumentation and assume that ICT reduces transaction costs and thus alters the location choice of FDI. We expect that firms operating at high ICT intensity are able to more freely choose

their host location. Moreover, greater new location advantages or vice versa decreasing traditional ones make researching the interface between ICT and FDI behavior even more important. We expect co-location in existing clusters to be more likely with market-oriented activities as opposed to a negative moderation effect with knowledge-seeking activities. Furthermore, we expect that cultural distance positively impacts the likelihood of co-location to existing cluster. Our conceptual model illustrates the proposed effect (see Figure 10).

Figure 10: **Conceptual Model**



2.1 The Impact of ICT on Co-location

The key assumptions about co-location advantages in international business theories have come under increasing scrutiny in the digital age (Nambisan, Zahra, and Luo, 2019; Alcácer et al., 2016; Hennart, 2019). Co-location decisions depend on mobile FSA and immobile location advantages (Cano-Kollmann, Cantwell, Hannigan, Mudambi, and Song, 2016). Both significantly impact the location choice of FDIs. We argue that ICT increases the mobility of FSAs and enables firms to utilize immobile location-specific advantages within a broader scope. This effect is becoming stronger as the global interconnectedness of specialized firms increases (Alcácer et al., 2016). From a transaction cost perspective, we argue that ICT lowers the likelihood of firms co-locating in existing clusters for three main reasons.

First, human capital has been a central component in the context of mobile FSAs (Dunning, 1998; Kirca, Hult, Roth, Cavusgil, Perry, Akdeniz, Deligonul, Mena, Pollitte, Hoppner, Miller, and White, 2011). Polanyi (1967) proposed two categories of knowledge, tacit and explicit, which have been used frequently in the FDI literature (e.g., see Dunning's OLI framework). Tacit knowledge represents the know-how embedded in people and organizations and is generally difficult to codify and transfer. Explicit knowledge, by contrast, is easy to identify and share across geographic space (Buckley and Carter, 2004; Brouthers et al., 2016).

Banalieva and Dhanaraj (2019) have suggested that ICT is a double-edged sword. Independently of location, it enhances the specialization of human skills and commoditizes explicit knowledge. Bloom et al. (2014) underlined the dispersion between specialization and commoditization. Their

empirical results showed that information technology centralizes knowledge. In contrast, communication technologies enhance knowledge distribution and thus increase the effectiveness of employee decisions at different levels of the organization (Bloom et al., 2014; Alcácer et al., 2016). This finding is important for FDI location choice since the returns of superior skills become location-independent and mobile while keeping activities under centralized control. Such advantages will help firms to more freely choose their FDI location. Thus, purely economic factors (e.g., location characteristics such as wage levels, market size, or physical infrastructure) are becoming more important than co-locating to existing clusters (Nielsen et al., 2017). We therefore argue that the level of ICT diminishes the importance of existing clusters whereas new geographical locations attract FDI inflow due to immobile location advantages.

Second, the digital age is redefining access to skilled labor. Such access and knowledge spillover among experts have been two of the main motivators of co-location. Recent literature suggests that ICT enables firms to source specialized knowledge at lower transaction costs from geographically independent locations or even through on-demand contract employment (Alcácer et al., 2016; Banalieva and Dhanaraj, 2019; Caspin-Wagner, Massini, and Lewin, 2018). With tacit knowledge, which is difficult to transfer, ICT supports international collaboration and knowledge integration. A number of studies in this research stream have concluded that the capacity to manage international knowledge networks inside and outside the company is a key asset for tacit knowledge generation (Cano-Kollmann et al., 2016). Under the condition of tacit knowledge ICT might change FDI location choice fundamentally. New software provider like Zoom or Microsoft Teams improve collaboration across geographical space significantly. Such innovations diminish the benefits of existing cluster. Furthermore, information science literature supports this line of argumentation by focusing more on the direct impact of ICT on R&D returns. Ravichandran, Han, and Mithas (2017)'s empirical results show that information technology increases the returns from R&D. The results also show that this effect is more pronounced for geographically complex R&D structures. "The effect of IT may be not as strong when the complexity is low, but when it is high, IT-enabled capabilities become indispensable" (Ravichandran et al., 2017, p. 822).

Third, strategic business scholars have suggested that not all firms benefit from co-location. Assuming that a cluster is an agglomeration of heterogeneous firms, Shaver and Flyer (2000) argued that firms with superior technology, knowledge, or human capital benefit less from agglomeration than their less advanced counterparts. Firms with a lower level of knowledge would greatly benefit from access to their competitors' knowledge. Thus, the most efficient firms will little enhance their expertise whereas their competitors will benefit substantially from co-location.

If ICT enables firms to more freely choose their FDI location, then we assume that firms will be less likely to co-locate. On the one hand, such advantages will help the firm to enhance its positioning in a competitive environment. On the other, ICT will allow firms to access new locations and leverage location-specific advantages, such as wage level, access to technology, or skilled labor (Alcácer et al., 2016). Moreover, Enterprise Resource Planning (ERP) systems (e.g., Oracle or SAP) enable companies to manage their global value chain and knowledge more efficiently (Bharadwaj, El Sawy, Pavlou, and Venkatraman, 2013).

If this is correct, then such ICT-based capabilities may be said to help the firm to make a location choice based on a broader set of options and thereby to reduce the importance of established clusters.

Thus, we expect that ICT facilitates superior information and reduces transaction costs before and after FDI. This will help firms to identify new opportunities in different locations. Since such opportunities increase the firm's competitive advantage, we expect the level of ICT to reduce the likelihood of co-location to an existing cluster on the firm level.

Hypothesis 1. The higher the ICT intensity, the lower the likelihood of FDI in a existing cluster.

2.2 Market vs. Knowledge Seeking

In today's fast-paced world, recognizing local, specialized knowledge sourcing and global integration has created new sources of competitive advantage (Li and Bathelt, 2018; Mudambi et al., 2018). The increased geographical dispersal of knowledge sources, combined with the ability to integrate new knowledge in a large customer base, serves as a global competitive advantage in the 21st century (Coviello et al., 2017; Mudambi et al., 2018; Banalieva and Dhanaraj, 2019). Based on the different nature of tacit and explicit knowledge, we expect that ICT impacts knowledge- and asset-seeking FDI types differently because of two main reasons.

First, the transaction costs of transmitting codified knowledge (tacit knowledge) are decreasing, and specialized knowledge remains geographically sticky (Li and Bathelt, 2018; Mudambi et al., 2018). Concurrently, new geographical locations are participating in global innovation networks (i.e., emerging markets such as India and China) (Awate and Mudambi, 2018). On the one hand, ICT enhances the transmission of tacit knowledge by leveraging software as well as hardware which oust traditional face to face interaction (Tang Linghui, 2010). Real time collaboration tools such as Microsoft 365, Google Cloud, or Apple Cloud allow simultaneous collaboration on files. Hardware is increasingly diminishing the gap between physical paper and virtual work. Zoom, Skype, and Microsoft Teams enhanced real time video calls and online collaboration for over two decades. During Covid-19 pandemic those tools became irreplaceable for firms to ensure social distancing while keeping their operations going. One could argue that prejudices have disappeared. Siemens announced in July 2020, that 140.000 of their employees in 125 locations in 43 countries can work where they are most productive, including at home, abroad or from a co-working space. Based on the above, we argue that transmitting tacit knowledge in the digital age became less costly and opens new FDI opportunities for firms. On the other hand, access to specialized knowledge is often unbalanced in terms of supply and demand. Existing specialized clusters are becoming less attractive due to the high costs of co-location (i.e., wage level, rents) - high demand low supply. Emerging locations can be accessed by ICT supported tools easier than ever (i.e., China, India). Thus new locations are becoming more attractive due to new location-specific advantages which could not have been accessed to the same extent without the support of ICT (Castelli and Castellani, 2013; Papanastassiou, Pearce, and Zanfei, 2019). Firms operating on a high level of ICT intensity can more efficiently transfer codified knowledge and thus are better able to leverage the global distribution of knowledge-seeking activities. Such advantages enable firms to operate in multiple locations and to source knowledge at lower transaction costs than less ICT-intensive firms. This in turn makes it easier to move outside of existing clusters and benefit from lower associated costs (i.e., lower wages,

lower rents). As a result, ICT intense firms strengthen their competitive advantage due to higher innovative output at lower costs, which makes co-location to existing cluster less pronounced.

Second, for market-seeking FDIs, access to customers and national contexts is essential (Mudambi et al., 2018). Global success depends on knowledge integration and monetizing innovation (Teece, 1986; Mudambi, 1998). ICT create an almost transparent market in terms of customer behavior and price levels. Price-search agents are digital shop bots that automatically examine prices and customer behavior at hundreds or thousands stores in a certain country or region at very small costs (Drnevich and Croson, 2013). Such advantages help firms to identify and follow growth opportunities. Alcácer et al. (2016) suggests that the digital age is highly urban. Global city-regions are central nodes that enable access to large customer base. The combination of ICT capabilities, which enables a distribution of explicit knowledge at almost zero costs, and the growth opportunities in cities, which are well connected to the host market, might increase the focus on established cluster of market seeking FDI. Furthermore, the adoption of local and national preferences is defined at this level. Market-seeking locations benefit from being well-connected to customers in the target market. Such conditions have contributed to the evolution of global clusters and global cities in the past. Goerzen et al. (2013) found that in particular serving a global market is enhanced by the interconnectivity of global cities and existing clusters. ICT enhances firms' understanding of customer needs by analyzing their behavior online as well as offline. Alcácer et al. (2016, p. 502) argued that "face-to-face interaction has not lost its key role as a complement (rather than a substitute) to cross-border connectivity." Marketing research shows that digitalization renovated the retailing industry by merging offline and online shopping experience. Sun, Yang, Shen, and Wang (2020) shows that ICT enables firms an integration of various distribution channels and unique retailing strategies (e.g., buy online and pick up in store). Thus, ICT enhances firms' ability to identify new growth opportunities in a host country which is well connected in the host market. Thus, we argue that market-seeking activities reduce the negative effect of ICT on firms' co-location. Hence, ICT advantages are key to the global success of knowledge integration but downstream activities remain cluster related.

In sum, ICT enables firms to access geographically dispersed knowledge and to innovate across geographical space at significantly lower transaction costs. Under such conditions, the negative relationship between ICT and cluster co-location becomes stronger. Opposed for market seeking activities the regional connectivity remains important and thus weaken the negative relationship between ICT and cluster co-location. The weakening effect results from the irreplaceable importance of understanding customer needs and national, local, and cultural differences, which ICT can replace only to a limited degree.

Hypothesis 2a. The negative relationship between the level of ICT investment and co-location is more pronounced with knowledge-seeking activities.

Hypothesis 2b. The negative relationship between the level of ICT investment and co-location is less pronounced with market-seeking activities.

2.3 Cultural Distance

International business research has identified the cultural distance between the home and host location as one of the main transaction cost drivers of FDI (Shane, 1994; Dunning, 1998; Johanson and Vahlne, 2009; Beugelsdijk et al., 2018a). Cultural distance describes the degree of distance between the home and host location along multiple cultural dimensions. In general, culture is defined as the values, beliefs, norms, and behavioral patterns of different nationalities (Leung, Bhagat, Buchan, Erez, and Gibson, 2005). The existing literature has acknowledged that cultural distance increases managerial and administrative costs and thus hampers internationalization (Johanson and Vahlne, 2009; Vahlne and Johanson, 2017; Ruigrok, Amann, and Wagner, 2007; Ruigrok, Georgakakis, and Greve, 2013). Recent research suggests that ICT reduces the transaction costs resulting from cultural distance to some degree, whereas other scholars have argued that cultural distance remains a key challenge (Lew, Sinkovics, Yamin, and Khan, 2016; Alcácer et al., 2016). Such transaction costs, resulting from cultural distance, alter the location choice of FDIs for three main reasons.

First, shared perceptions of procedural processes and a common understanding of business objectives vary across different national or even subnational cultures (Leung et al., 2005). Luo (2005) highlighted the crucial role of shared perceptions in procedural justice and business relationships, as well as their impact on managerial transaction costs. If cultural distance is high, firms tend to choose global cities or existing clusters (Goerzen et al., 2013). Global cities and existing clusters are characterized by greater diversity (e.g., workforce, nationalities) and their connection to global markets. Hence, foreign firms do not experience the same level of cultural distance than locating to a rural location (Wu, 2000; Wei and Leung, 2005). Such advantages help firms to reduce the risk of misunderstanding, administration, and managerial costs. Accordingly, co-location is more likely if cultural distance is high.

Second, culture and information flows are closely interrelated. Cultural differences hamper matching problems and solutions due to different values and norms. For example, an aircraft crash involving Avianca Airlines was partly blamed on cultural differences among crew members. The airplane crashed because the captain misinterpreted the warnings of the Ground Proximity Warnings System. Examining the flight recorder data showed that the copilot had quietly asked questions about ground proximity. The copilot, who came from a national culture in which subordinates tend not to confront superiors with adverse information in order to maintain harmonious relations, pointed out the problem while agreeing with the captain's opinion (Helmreich, 1994; Leidner and Kayworth, 2006). This example illustrates how powerfully culture impacts people and organizations in information flow processes. Recent MIS literature suggests that ICT supports firms in centralizing knowledge and in decentralizing information regardless of geographic space (Bloom et al., 2014). In particular, Enterprise Resource Planning Systems (ERP) help firms to collect, share, and store information regardless the location and cultural environment. Such advantages help firms to monitor organizational processes and to safeguard themselves against missing or incomplete information. ERP systems and advanced ICT grant firms more freedom with allocating critical decisions across the organization. Hence, ICT will help firms to manage information flows, engage with foreign customers, and reduce the risk of information gaps caused by cultural differences (Mithas, Tafti, Bardhan, and Goh, 2012; Wu and Gereffi, 2018).

Third, cultural differences also impacts usage and development of IT. Such IT-cultural differences hamper the resulting benefits on firm level and subsequently alter the FDI location choice. Information Science researchers studied the impact of culture on IT on national and organizational level. An important contribution of the IT-culture research has been the perspective that IT is symbolic (Feldman and March, 1981; Scholz, 1990) and thus subject to cultural interpretations. Leidner and Kayworth (2006) argues that IT-culture conflicts arise in three different ways. First, a system conflict occurs due to contradicting values and believes between the embedded IT and the user. For example, a knowledge management system (KMS) is designed to foster communication and exchange among employees. Such systems are perceived differently by Individualism vs. Collectivism cultures. Hofstede (1980) findings show that in a collectivism context, knowledge sharing is more prevalent than in individualistic cultures. Under such conditions the success of IT systems depends on cultural differences and not on the technology itself (Walsh, Kefi, and Baskerville, 2010). Second, a contribution conflict arise due to a mismatch between the perceived values and norms and the IT application. Such a conflicts occur by introducing monitoring systems which are espoused to increase quality and standards. In low power distance cultures, such systems can be perceived as control mechanisms. Third, vision conflict describes the different value reception of IT. For example an ERP system is designed to reduce uncertainty along the value chain and to promote efficiency (Kim, Mithas, and Kimbrough, 2017). However, such systems works best in a cultural environment with high level of uncertainty avoidance. The conflict arises if the user perceives the documentation as a time consuming burden and unnecessary, which is likely in a cultural context with low level of uncertainty avoidance. Thus we argue that IT-culture differences increase transaction costs and alter the FDI location. Consequently, the co-location to cluster will be more pronounced in cultural distance locations, even ICT capabilities are high.

Based on the above, we propose that existing clusters remain dominant in reducing cultural barriers and become more pronounced with greater ICT intensity. ICT-intensive firms will benefit from increased ICT-based monitoring capabilities and will thus be able to reduce their managerial and administrative costs. Accordingly, we expect existing clusters to benefit from ICT and hence to become even more likely target locations under the condition of high cultural distance.

Hypothesis 3. Co-location in existing clusters becomes more pronounced under the condition of high-level ICT and cultural distance.

3 Research Methods

3.1 Sample and Data

This study is based on a sample of all firms publicly listed in Switzerland, The Netherlands, Germany, and the United Kingdom. We chose this setting for three reasons. First, all of these countries serves as the headquarters of major international firms with sufficient FDI activity. Second, we selected these countries due to the availability of sufficient country-level infrastructure. We thus assumed that the companies in our sample had access to ICT at the time of study and could reap the proposed

ICT-based benefits. Third, the four countries had leading stock exchanges in the European Union for the five years prior to the study (Worldatlas, 2018). Our sample covered the period 2011–2015.

We sourced our variables from the fdi Markets, Aberdeen, and Thomson Reuters Eikon databases. All FDI-related variables were sourced from fdi Markets. Fdi markets tracks cross-border greenfield investments across the world (Castellani and Lavoratori, 2019). All ICT variables came from Aberdeen’s European database. The Aberdeen database, former Harte Hanks, contains over 160,000 firms on the plant level across 20 European countries (Bloom et al., 2014). This database is frequently used in leading academic journals to derive IT-related variables¹⁴ (e.g. Ray, Xue, and Barney 2013; Bloom et al. 2014; Kim et al. 2017). For all remaining variables, we used the Thomson Reuters Eikon database and cross-validated this with Bloomberg Terminal data.

Due to missing data for IT-related variables, we applied the following selection criteria. First, we excluded small and medium-sized (SMEs) due to missing data and insufficient FDI activity. We excluded SMEs based on the European Union’s definition of SMEs: “companies with less than 250 staff headcounts, annual revenues of less or equal to EUR 50 million, and total assets of less or equal to EUR 43 million” (EuropeanUnion, 2017). Second, we excluded firms serving as financial investment vehicles or pure holding entities. We made this selection based on the primary SIC code of 67. Third, we excluded subsidiaries unable to lto make independent decisions. Fourth, we excluded firms with missing data. The final sample included 261 firms and 1,288 FDI deals. Multiple firms effected FDIs more than once during our study period (2011–2015), with BASF AG coming out on top (121 in total). Maharashtra and Shanghai were the most targeted locations (each recording 43 FDIs). We applied logistic regression analyses clustered by firm using Stata 14 throughout. We applied clustering to control for firm-specific effects.

3.2 Measures

3.2.1 Dependent Variable

Our dependent variable was a dummy variable that we coded as 1 if the company undertook an FDI in an existing cluster destination. The dummy was coded as 0 if the company invested in a location that had not been recognized as a cluster (50.54% outside cluster, 49.46 % in cluster). Following Castellani and Lavoratori (2019), we defined a knowledge cluster as the cumulated number of foreign direct investments made by all firms in a city between 2003 and 2010.

3.2.2 Independent Variable

ICT intensity represents aggregated ICT spending on the firm level, using employee weights.¹⁵ Following Devaraj and Kohli (2003), we lagged the independent variable by $t - 2$ in the time period. For a time lag $t - 3$, the results were consistent. The lag covered the time between investment, implementation, and the effect of ICT. Since ICT intensity was not normally distributed, we applied the natural logarithm following Boone, Lokshin, Guenter, and Belderbos (2019).

¹⁴Please see Bloom et al. (2014) for more information.

¹⁵For details, please see Sabherwal and Jeyaraj 2015

3.2.3 Moderator

We distinguished market- and knowledge-seeking activities. First, we included only deal types that could be clearly assigned to market- knowledge-seeking activities. We categorized FDI deals as follows: First, by market-seeking activities: Customer Contact Center, Education and Training, Logistics, Distribution and Transportation, Maintenance & Service, Sales, Marketing & Support, and Technical Support Center. Second, by knowledge-seeking activities: Design, Development & Testing, Research & Development, Regional Headquarters, and ICT & Internet Infrastructure. The final split resulted in 54.27% asset seeking investments and 45.73 % knowledge seeking investments.

For the second moderator, cultural distance, we calculated cultural differences between the home and host country using the KS-Index Kogut and Singh (1988). International business literature has recognized that cultural distance is a main transaction cost driver and strongly impacts FDI location choice (Kogut and Singh, 1988; Rugman and Verbeke, 2004; Johanson and Vahlne, 2009; Vanninen, Kuivalainen, and Ciravegna, 2017). We applied the KS-Index using Hofstede's four cultural dimensions: individualism-collectivism, uncertainty avoidance, power distance, and masculinity-femininity (Hofstede, 1980).

$$KS\ Index = \sum_{i=1}^n \{(I_{ij} - I_{iHome})^2 / V_i\} / N$$

Where I_{ij} represents to the mean (j) on Hofstede's i th cultural dimensions of the host country. I_{iHome} is the country's mean on the respective Hofstede dimension. V_i is the variance of the i th dimension. N is the number of dimensions (Beugelsdijk et al., 2018b).

3.2.4 Control Variables

To control for firm size differences, we included firm size as a control variable for two reasons. First, ICT intensity might be influenced by firm size. Second, FDI intensity might differ due to firm size. We used the total number of employees as a proxy for firm size and corrected the distribution by the natural logarithm (Boone et al., 2019). We controlled for the home country by using country dummy variables. This is important for two main reasons. First, the need for internationalization and expansion depends on the size of the home market. Firms in Switzerland have a greater need to expand, which might impact their FDI activity. Second, the home country might impact the availability of ICT infrastructure. As such country- specific effects might have biased our results, we controlled for country-level differences by including country dummy variables (Alcácer et al., 2016). Moreover, we controlled for industry differences by using one-digit industry SIC codes. In addition to that we controlled for R&D spending to sales to take the innovative power of a firm into account. We also controlled for Financial leverage which represents the firm's financial resources. Financial leverage might impact FDI activity because international growth is more likely to be financed by equity than debt (Belderbos, Tong, and Wu, 2018), measured as long-term debt to total capital. We included geographical distance as a measure of the distance between home city location and FDI host city location. This was important in order to decouple cultural and regional distance. Geographical distance was measured in kilometers, calculated as linear distance. In addition, we also

controlled for institutional distance between the home and host country, following Beugelsdijk et al. (2018a). We applied the ID Index using the EFI indicators of the Heritage Foundation: property rights protection, corruption levels, fiscal freedom, government spending, and the six indicators measuring the freedom of doing business, trade, finance, and investment:

$$ID\ Index = \sum_{i=1}^n \{(I_{ijy} - I_{ijyHome})^2 / V_i\} / N$$

Where I_{ij} is the mean (j) of the EFI's i th indicator, excluding Trade Freedom and Investment Freedom in a given year y . I_{iHome} is the country's mean on the respective EFI dimension. V_i is the variance of the i th dimension. The number of dimensions is represented by N . Moreover, we controlled for Trade Freedom and Financial Freedom of the host location by using the scores provided by the Heritage Foundation EFI. To control for firm level experience at the host location, we included dummy variables for co-location, expansion, and new location. Co-location describes whether the company adds a new activity to an existing subsidiary (e.g., R&D FDI to an existing production plant). Expansion describes whether the company has experience in the country but not in the region. New describes new FDIs without any prior experience in the location or the country. Furthermore, we controlled for industry dynamism. Industry dynamism measures the level of change in an industry sector and represents the level of instability a firm faces (Dess and Beard, 1984; Ruigrok et al., 2013). We calculated industry dynamism in two steps, as described by Dess and Beard (1984). First, we used the regression coefficient of time on the average two-digit industry annual sales on a two-digit SIC code level between 2011 and 2015. Second, we divided the standard error by the average sales of the respective industry (Zhang and Rajagopalan, 2004). Furthermore, we controlled for deal type, industry, country, and year.

4 Results

Table 21 shows the descriptive statistics of all variables. We used a binary logistic regression model to estimate the likelihood of FDI co-location to an existing cluster. Hence, we coded the dependent variable as equalling 1 if the FDI investment destination was within an existing cluster and 0 if the FDI investment took place outside an existing cluster. We conducted the firm-level analysis using cluster-robust standard error to correct for the correlation of multiple FDI investments of the same company or for intra-group correlation (Gooris and Peeters, 2015).

Table 21: Descriptives and Correlations

	Mean	s.d.	Min	Max	Cluster(dummy)	Firmsize	Industry_Dynamism	R_and_D_Intensity	Return_of_Assets	Foreign_Sales_to_Total_Sales	Geographical_Distance	id_index	investment_freedom	trade_freedom	ICT_Intensity	Cultural_Distance
Cluster(dummy)	0.495	0.500	0	1	1											
Firmsize	11.173	1.618	5.068	13.38	-0.0705*	1										
Industry Dynamism	0.156	0.376	0	4.590	-0.0206	-0.181*	1									
Research & Development Intensity	2.281	4.035	0	22.68	0.0418	-0.228*	-0.0624*	1								
Return of Assets	5.156	4.678	-26.23	37.06	0.0484	-0.138*	-0.0503	0.239*	1							
Foreign Sales to Total Sales	70.86	20.18	0	100	0.0440	0.140*	-0.125*	0.312*	0.0387	1						
Geographical Distance	6339.44	3870.72	35.36	18327.06	0.108*	0.0270	0.0103	-0.0298	0.0166	0.0644*	1					
ID index	1.549	1.102	0.104	7.394	0.0621*	0.0986*	0.0722*	-0.0496	0.00172	0.0397	0.329*	1				
Investment freedom	2.903	3.369	0	17.632	0.0875*	0.0753*	0.0450	-0.0275	0.0183	0.0304	0.309*	0.869*	1			
Trade freedom	0.546	3.369	0	17.63	0.105*	0.0403	-0.00197	-0.0325	0.0181	0.0642*	0.235*	0.657*	0.629*	1		
ICT Intensity	5.023	1.726	0.773	9.795	0.0113	-0.353*	0.0566*	0.131*	0.196*	-0.0902*	-0.0405	-0.0658*	-0.0408	-0.0367	1	
Cultural Distance	1.598	1.329	0	6.238	0.202*	-0.0746*	0.0368	0.0409	0.0248	0.0811*	0.200*	0.354*	0.352*	0.209*	0.0269	1

* $p < 0.05$

We estimated a logit regression model in five configurations. The models are presented in Table 22. Model 1 only includes the control variables. Model 2 introduces the variable “ICT intensity.” Model 3 adds a dummy variable “market seeking vs. knowledge seeking.” We coded knowledge-seeking activities as 1 and market seeking activities as 0. Model 4 tests the variable “cultural distance” as an independent moderator. Model 5 represents the full model with both moderators. We found partial support for Hypothesis 1. The result indicates a negative effect of ICT on FDI co-location to existing clusters, but is not significant (-0.034 , $p > 0.05$). Hypothesis 2a is supported. Our results provide significant support for a positive moderation effect for market-seeking activities (0.126 , $p < 0.10$). We also found significant support for Hypothesis 2b, expecting a negative moderation effect for knowledge-seeking FDIs (-0.113 , $p < 0.05$). Hypothesis 3, the moderating effect of cultural distance, is supported and highly significant (0.055 , $p < 0.000$). We tested our model for violations of the basic regression assumptions, i.e., multicollinearity, normality, and linearity, and found no violations. As a robustness test, we split our sample randomly into two parts and reran the same analysis on the reduced sample size to test the robustness of our findings. All supported hypotheses were confirmed by the robustness test (for the results, see Table 24 in the Appendix). In table 23 we plotted the moderation effects for asset- vs. market-seeking (Hypothesis 2) activities as well as for cultural distance (Hypothesis 3). The moderation plots in table 23 support our results. The confidence intervals are slightly overlapping at very low level of ICT intensity. Despite the overlap both effects are in line with our results in table 22.

Table 22: Regression Results

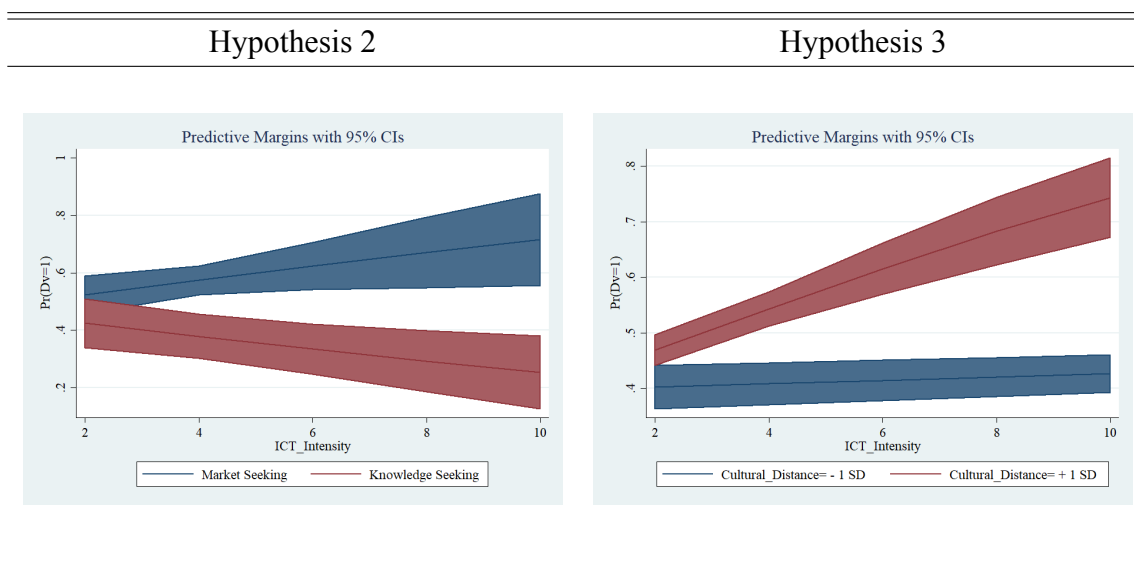
	Model 1		Model 2		Model 3		Model 4		Model 5	
Firm size	-0.129*	(0.0543)	-0.140*	(0.0566)	-0.129*	(0.0567)	-0.0755	(0.0551)	-0.104†	(0.0566)
Industry Dynamism	-0.316	(0.267)	-0.308	(0.267)	-0.287	(0.262)	-0.290	(0.268)	-0.238	(0.263)
Research & Development Intensity	-0.00116	(0.0190)	0.00124	(0.0192)	0.00611	(0.0193)	-0.00727	(0.0190)	0.00776	(0.0192)
Return of Assets	0.0152	(0.0157)	0.0165	(0.0158)	0.0177	(0.0158)	0.0102	(0.0158)	0.0159	(0.0159)
Foreign Sales to Total Sales	0.00918*	(0.00390)	0.00949*	(0.00392)	0.00779*	(0.00396)	0.00692†	(0.00396)	0.00627	(0.00399)
Co-Location	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Expansion	0.184	(0.307)	0.180	(0.307)	0.137	(0.308)	0.304	(0.309)	0.266	(0.308)
New	-0.496†	(0.299)	-0.492†	(0.299)	-0.530†	(0.300)	-0.468	(0.300)	-0.475	(0.299)
Deal type dummy					included					
Country dummy					included					
Year dummy					included					
Industry dummy					included					
Geographical Distance	0.0000630***	(0.0000171)	0.0000627***	(0.0000171)	0.0000623***	(0.0000171)	0.0000592***	(0.0000171)	0.0000568***	(0.0000170)
ID Index	-0.199	(0.123)	-0.199	(0.123)	-0.203	(0.124)	-0.311*	(0.130)	-0.332*	(0.131)
Investment Freedom	0.0601	(0.0381)	0.0601	(0.0381)	0.0644†	(0.0381)	0.0494	(0.0390)	0.0516	(0.0389)
Trade Freedom	0.371**	(0.117)	0.366**	(0.117)	0.373**	(0.117)	0.435***	(0.121)	0.434***	(0.121)
ICT Intensity			-0.0342	(0.0502)						
Market Seeking × ICT Intensity					0.126†	(0.0753)			0.00732	(0.0778)
Knowledge Seeking × ICT Intensity					-0.113*	(0.0570)			-0.222***	(0.0596)
Cultural Distance × ICT Intensity							0.0555***	(0.00940)	0.0631***	(0.00986)
Constant	-0.490	(0.875)	-0.162	(0.997)	-0.920	(1.029)	-1.422	(0.895)	-0.859	(1.028)
N	1288		1288		1288		1288		1288	
Wald χ^2	93.80		94.45		100.5		116.8		128.4	

Standard errors in parentheses

Source: Camillo Werdich

† $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 23: Moderating Effects



5 Discussion and Conclusion

This study sheds new light on the interface between ICT intensity and FDI location choice, with a special focus on co-location to existing clusters. We used a dataset of 1,288 greenfield cross-border FDI deals of 261 firms from Switzerland, Germany, the Netherlands, and the United Kingdom. We drew on insights from the MIS literature and explored the impact on FDI location choice. We focused on FDI location choice because cross-border expansion remains a major vehicle for growth and digitalization in the evolving global landscape.

The theoretical and empirical inclusion of ICT has already advanced some fields including marketing or information science, whereas international business and strategy research is merely at the beginning and lags behind other fields (Hazlehurst and Brouthers, 2018; Banalieva and Dhanaraj, 2019). Our two central questions – To what extent and in what way does ICT intensity impact the likelihood of foreign direct investments being co-located? And what is the moderating role of cultural distance and business type activities? – are intended to address this shortcoming and to contribute mainly to international business literature by showing that ICT alters location choice. We found empirical evidence that ICT intensity alters firms' FDI location choice. In particular, we found different effects for market- and knowledge-seeking activities. Moreover, our results show that cultural distance remains a challenge even in the digital age. Our results also show that ICT intensity has different effects on FDI location choice depending on the type of business activity and on the cultural environment of the host location. Overall, we make three important contributions.

First, our results show that ICT intensity does not change the likelihood of co-location to an existing cluster per se. We have argued that ICT intensity alters traditional cluster advantages such as access to skilled labor or knowledge spillovers among experts. Our empirical results partly support our hypothesis with a negative, yet non-significant effect. The non-significant effect can be explained by the bidirectional effect of ICT on different FDI motives (market seeking vs. knowledge seeking). Thus, we conclude that context-specific analysis is necessary to unlock the benefits of ICT.

Second, one of our key findings is that ICT has a bidirectional effect. With market-seeking activities, ICT intensity increases the likelihood of co-location to existing clusters whereas with knowledge-seeking activities, firms are more likely to move their FDIs to new locations. This spread underlines Mudambi et al. (2018)'s local knowledge sourcing and global knowledge integration perspective. Beyond this perspective, our results contribute to internationalization theory by showing that ICT increases the shift from the concept of physical location to information exchange. The results mainly address the recent debate on internationalization and firms' competitive advantage in the *Journal of international business studies* (Alcácer et al., 2016; Mudambi et al., 2018; Hutzschenreuter and Harhoff, 2020). Our results provide empirical support for the changing nature of competitive advantages by showing that knowledge sourcing and knowledge integration follow different location strategies. We found strong support for a distinct FDI strategy for knowledge seeking activities and highlighted the changing role of tacit knowledge, which was assumed to be difficult to transfer. Our results demonstrate that ICT enhances tacit knowledge exchange on a global basis and suggest the end of the rise agglomeration effects for knowledge seeking activities. During Covid-19 pandemic ICT tools became irreplaceable for firms to ensure social distancing while keeping their operations going. Prejudices about virtual collaboration have disappeared. Some established firms even allow their employees to work location independent after the Covid-19

pandemic. This underlines our findings, that tacit knowledge is no longer difficult to transfer. Thus, our findings enrich prior internationalization theory and transaction cost theory.

Third, our results extend our understanding of cultural distance in the digital age. Our empirical results show that cultural differences remain a principal reason for co-location to existing clusters even if ICT intensity is high. By considering the cultural environment, we have addressed one key feature of FDI research (Shenkar, 2012; Zeng, Shenkar, Lee, and Song, 2012; Beugelsdijk et al., 2018a). Despite greater freedom of location choice, cultural distance remains a major source of uncertainty. Thus, while ICT intensity helps to manage and monitor foreign operations, it does not contribute to overcoming European top managers' decision barrier to undertake greenfield investments in a new location (i.e., outside an existing cluster). In such cases, firms may use alternative entry modes (e.g., licensing or joint ventures) requiring less commitment, yet accordingly resulting in less return. We isolated the cultural distance effect from both the geographical and the institutional distance between home and host city, which prior research has often neglected (Beugelsdijk et al., 2018a). Thus, rather than asking whether or not national culture matters, we address how and when cultural differences matter (Lew et al., 2016). In doing so, we contribute to the unsettled debate about cultural distance in international business research by focusing on the interface between ICT and FDI location choice.

Regardless of the academic relevance of our study, it has two implications for managerial practice. First, we provide insights into the bidirectional impact of ICT on FDI location choice. This finding helps managers to properly define their investment decision strategy. This is becoming increasingly important as coordinating and controlling different business activities requires increasing effort amid growing global competition. Thus, our results are most relevant for MNEs. The balancing of local knowledge sourcing and global knowledge integration enabled by ICT affects firms' strategy regarding their competitive position, innovation, and performance. Hence, gaining a fundamental understanding of the relationship between ICT, location choice, and the type of business activity is paramount. Second, we show that cultural distance remains a key challenge in the digital age. Thus, managers should not overestimate the benefits of ICT and ought to carefully assess the cultural context of the host location. In extreme cases, for instance, if cultural distance is high, an internationally experienced top management team might be important; if such experience is lacking, firms are advised to carefully assess alternative entry modes.

6 Limitations and avenues for further research

The limitations of the present study open up promising directions for further research. We have argued that ICT impacts the FDI location choice of firms and have focused on the moderating impact of business activity type and cultural distance. Admittedly, our measurement of ICT intensity is coarse. The advantage of our approach is a cross-industry research design. However, different industries require diverse ICT configurations. Thus, future industry-specific studies are likely to produce stronger results. Despite much existing research (including ours) utilizing an aggregated ITC measurement (Ray, Barney, and Muhanna 2004; Bloom et al. 2014), we recommend further research to use industry-specific measurement. Another limitation of this study is its focus on FDI (greenfield investments). We chose this focus to isolate the effect of location choice and to exclude

external prior influence. This approach allowed us to ensure that no other external factors impact location choice, which would not have been the case with mergers or acquisitions and would have biased our results. We recommend conducting similar studies with a broader set of entry modes (i.e., licensing, strategic alliances, mergers) in order to gain more insights into ICT and its impact on shared controlled entry modes. Yet another limitation stems from our measuring of cultural distance. We used Hofstede's dimensions and assumed that these remain stable over time and do not vary across countries. Beugelsdijk et al. (2018a) highlighted this major limitation and discussed possible alternatives. As a result, the currently available public options all have limitations. Some scholars have argued that culture changes over time and become less power-distant, more individualistic, as well as more indulgent and emancipated (Fernandez, Carlson, Stepina, and Nicholson, 1997; Inglehart, 1997; Beugelsdijk and Welzel, 2018). Following this cue, we can imagine that more fine-grained measurement of cultural distance will lead to fruitful further research. We have not tested our model with other cultural measurements due to the limited data available for the sampled host countries. Alternative approaches would have included Schwartz (1999)'s or House, Hanges, Javidan, Dorfman, and Gupta (2004)'s cultural dimensions. Another fruitful research direction would be to focus on firm-specific ICT components, which serve as a basis for IT-enabled firm-specific advantages. Such firm-specific capabilities, being hard to imitate and rare, might alter the results (Bharadwaj et al., 2013; Drnevich and Croson, 2013). Lastly, the present study focused on the years 2011-2015. A similar study post Covid-19 seems to be another promising research direction and might strengthen our results. During the crisis, firms have been forced to adapt to ICT to maintain social distancing and keep their operations going. This forced digital transformation might strengthen our results from 2011-2015.

7 Conclusion

This study has examined the determinants of firms' decision to co-locate to existing clusters. We have focused on the role of ICT and the impact of market- and knowledge-seeking activities. We also addressed cultural distance and its impact in this context. Our results make important contributions to the FDI and international business literature and provide fruitful insights for MIS literature. Our results indicate that ICT generally reduces the power of existing clusters, yet differs significantly with market- and knowledge-seeking activities. We also show that cultural distance between the home and host location remains a key challenge in international expansion even if ICT intensity is high.

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8 Appendix

This section presents additional analyses. Table 24 shows that we ran the same analyses using the same model configurations but divided our sample randomly by two. The result for the baseline effect have not changed and are yet not significant. Model 3, the moderation of market- vs. knowledge seeking decreased to ($p < 0.10$), driven by the 50% smaller sample. However both effects are in line with our initial setting. For cultural distance, Model 4, the effect remains highly significant and is in line with our initial configuration. In the full model 5, the results confirm our initial analysis. Overall, the regression coefficients confirm our results.

Table 24: Robustness Test Regression Results

	Model 1		Model 2		Model 3		Model 4		Model 5	
Firmsize	-0.145 [†]	(0.0766)	-0.158*	(0.0806)	-0.142 [†]	(0.0813)	-0.111	(0.0783)	-0.138 [†]	(0.0826)
Industry Dynamism	0.0487	(0.340)	0.0527	(0.341)	0.0837	(0.333)	0.0764	(0.339)	0.121	(0.333)
Research & Development Intensity	0.00496	(0.0265)	0.00743	(0.0269)	0.0115	(0.0270)	-0.00317	(0.0270)	0.00894	(0.0276)
Return of Assets	-0.0161	(0.0211)	-0.0147	(0.0213)	-0.0138	(0.0214)	-0.0220	(0.0213)	-0.0177	(0.0217)
Foreign Sales to Total Sales	0.0104 [†]	(0.00559)	0.0107 [†]	(0.00561)	0.00815	(0.00570)	0.00848	(0.00568)	0.00684	(0.00577)
Co-Location	0	(.)	0	(.)	0	(.)	0	(.)	0	(.)
Expansion	0.230	(0.463)	0.231	(0.463)	0.220	(0.470)	0.376	(0.470)	0.395	(0.475)
New	-0.389	(0.448)	-0.384	(0.448)	-0.373	(0.454)	-0.316	(0.452)	-0.274	(0.456)
Deal type dummy					included					
Country dummy					included					
Year dummy					included					
Industry dummy					included					
Geographical Distance	0.0000434 [†]	(0.0000232)	0.0000433 [†]	(0.0000232)	0.0000463*	(0.0000235)	0.0000429 [†]	(0.0000234)	0.0000453 [†]	(0.0000237)
ID Index	0.0237	(0.179)	0.0248	(0.179)	-0.0140	(0.181)	-0.140	(0.190)	-0.204	(0.194)
Investment Freedom	0.0497	(0.0522)	0.0499	(0.0522)	0.0594	(0.0525)	0.0467	(0.0532)	0.0554	(0.0537)
Trade Freedom	0.306 [†]	(0.179)	0.301 [†]	(0.179)	0.316 [†]	(0.180)	0.402*	(0.184)	0.419*	(0.186)
ICT Intensity			-0.0371	(0.0689)						
Market Seeking × ICT Intensity					0.175 [†]	(0.106)			0.0691	(0.110)
Knowledge Seeking × ICT Intensity					-0.142 [†]	(0.0798)			-0.231**	(0.0845)
Cultural_Distance × ICT Intensity							0.0480***	(0.0135)	0.0549***	(0.0144)
Constant	-2.839 [†]	(1.518)	-2.437	(1.693)	-3.429*	(1.742)	-3.548*	(1.541)	-3.158 [†]	(1.753)
N	636		636		636		636		636	
Wald χ^2	55.91		56.22		62.17		65.48		73.03	

Standard errors in parentheses

Source: Camillo Werdich

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Part VI

Conclusion

1 Summary of key findings

This dissertation has explored the impact of digitalization on international business research. A systematic literature review and three empirical chapters have contributed to better understanding three related areas of inquiry: the degree of internationalization, internationalization behavior, and the location choices of European firms. The research has led to four main findings.

First, the systematic literature review has identified opportunities for further researching the interface between internationalization and digitalization. The review focused on the antecedents and consequences of digitalization in the field of international business and advances internationalization theory. It proposes integrating MIS and IS knowledge to fill the gaps in international business research. It recommends that scholars better heed that knowledge to keep pace with the progress being made in other fields. Thus, chapter 1 provides multiple avenues for further research and proposes a rigorous research framework. This framework formed the basis for the three empirical chapters.

Second, chapter 2 has studied the impact of ICT on the degree of internationalization – a key determinant of MNEs. It has provided empirical evidence that firms can leverage ICT to increase their international position (measured as foreign-sales-to-total-sales). It has also demonstrated that under the condition of high cultural distance the effect of ICT is more pronounced than for low cultural distance. Hence, firms can leverage digitalization to overcome cultural barriers to some extent for international sales. Similarly, this paper found a positive moderation effect for high dynamic industries. This indicates that ICT supports firms in better coping with uncertainty in their business environment than their counterparts in low dynamic environments.

Third, chapter 3 has empirically demonstrated that ICT impacts firms' internationalization behavior in terms of speed, scope, and location dispersion – three central components of international business research. It has closely studied the role of market-seeking and asset-seeking activities. As such, it not only advances previous studies, which have ignored this important distinction. It has also addressed the lack of nuanced understanding of how ICT impacts speed, scope, and location dispersion. While scope (measured as investment volume or jobs created in a host location) does not change under market- or asset-seeking activities, speed and location dispersion are affected fundamentally differently by ICT under such conditions. The results highlight the changing role of FSA in the digital age, as underscored by Banalieva and Dhanaraj 2019. This chapter indicates that FSAs result rather from information exchange than from physical locations. In sum, this chapter suggests that there is no simple answer to the question of how digitalization affects internationalization behavior. Rather, the findings highlight the importance of the distinct effect on certain FDI activities.

Fourth, chapter 4 has examined city-level FDI location choice – which remains a major vehicle for growth in international business. This chapter has explored the effect of ICT on location choice and found only partial support for a direct relationship. Delving further into this topic revealed

a bidirectional effect of ICT for market- and knowledge-seeking activities. This chapter has also provided theoretical and empirical results that ICT enhances the need for colocation to existing clusters for market-seeking activities while the impact becomes negative for knowledge-seeking activities. Hence, FDI investments still follow markets but knowledge and information advantages can be leveraged location- independently on a global basis, resulting in greater freedom of location choice. Furthermore, this chapter has demonstrated that in FDI location choice, cultural differences remain a key challenge for firms. Despite greater freedom of location choice, cultural differences between the home and host location diminishes the effect of ICT. Thus, while ICT enables firms to access new locations, it does not contribute to overcoming European top managers' decision barrier to make FDI greenfield investments in new locations, i.e., where no cluster exists.

2 Theoretical contribution

This dissertation contributes to international business research by providing new insights into internationalization in the digital age, a link that remains ignored. It also advances existing theoretical understanding in three ways. First, the most central contribution of this dissertation is that it bridges two (still) independent research streams (i.e., international business and MIS). The interactive effect with established transaction cost drivers has become evident in all three empirical papers. As such, this dissertation has validated Banalieva and Dhanaraj (2019)'s suggestion that the source of FSA shifts from the concept of physical places to information exchange. To this end, this dissertation not only provides a systematic review of the current literature. It also theoretically integrates the concept of digitalization into three layers of international business (degree of internationalization, internationalization behavior, and location choice). In sum, the research presented here highlights the missing link with digitalization in the field of international business and underlines the importance of three central layer with various empirical results.

Second, another key finding of this dissertation is the bidirectional effect of ICT on the internationalization process. The counterintuitive finding of a bidirectional effect of ICT contributes to better understanding how and under which conditions ICT can be leveraged by firms – this notion is central to internationalization theory. On the one hand, this is an important contribution to ongoing and future research as it emphasizes the distinct effect of ICT on theory development. On the other hand, this bidirectional effect underlines the limitations of digitalization. Thus, the impact of ICT highly depends on context. This aspect should be considered by further research in order to advance internationalization theory.

Third, the findings of this dissertation expand internationalization theory by focusing on the effect of ICT coupled with established transaction cost drivers in international business (i.e., cultural distance and dynamic business environments). This finding advances both different disciplines and the level of theory and analysis. The present empirical results contribute to the ongoing discussion about cultural distance (Beugelsdijk, Ambos, and Nell, 2018) by showing that ICT helps firms to increase their degree of internationalization and to overcome cultural barriers in terms of sales (see chapter 2). In this vein, chapter 4 has shown that culture remains a key challenge for European firms and its decision makers when considering entering a new location, where cultural distance is high despite the enhanced degree of freedom in their location choice. Thus, drawing on transaction

cost theory, this dissertation stresses the complexity of the interaction between ICT and cultural distance. This multi-disciplinary relationship should be taken into account in further research in order to advance the transaction cost lens in international business.

Strategy scholars might consider including ICT theoretically and practically to improve our understanding of strategy and to open up new avenues for growth. The results of this dissertation provide new research opportunities for resource-based theory- driven research by showing that ICT enhances both international positioning and the degree of freedom in location choice. Thus, future strategy research should focus on the impact of ICT on scanning the environment and emerging business opportunities. Overall, better understanding the impact of ICT improves strategy development in theory and practice.

3 Managerial implications

This dissertation also provides important findings for business practitioners and top managers of MNEs. First, it sheds new light on two main trends facing firms. It also expands our knowledge about the interaction of two key trends in international business: internationalization and digitalization. On the most general level, the results show that MNEs can leverage ICT to operate on a greater degree of internationalization, even if cultural distance is high. This advantage should help decision makers to capture or create value from more imperfect international markets. From a strategic point of view, this might serve as a basis for growth while strengthening strategic positioning in an increasingly interconnected world.

Second, the findings regarding speed, scope, location dispersion, and location choice underline the importance of fundamentally understanding the interaction between digitalization and internationalization. On the one hand, this dissertation provides insights into the importance of ICT-supported strategic capabilities (i.e., speed and location dispersion). These advantages can be used to respond to increasingly global and interconnected market environments. This in turn will help firms to strengthen their position in such an environment. On the other hand, the findings demonstrate – theoretically and empirically – that the concept of physical location might no longer be a source of competitive advantage. Instead, information exchange and the flexibility to source knowledge location-independently and to integrate knowledge globally seem to be becoming increasingly important. Thus, decision makers should be aware of the changing configuration of firm-specific advantages in the digital age.

Third, the results show that cultural distance between the home and host country remains a key challenge for European firms despite ICT-enhanced capabilities for reducing uncertainty in an international context. Thus, decision makers should be aware of digital capabilities and understand cultural differences at the same time. This in turn requires top executives to have a unique profile in the near future in order to remain globally competitive in the digital age. The results of this dissertation suggest that the interdisciplinary configuration of a top management team and in particular international experience will become more important than ever. Organizations should therefore be aware of the diversity of their top management teams.

4 Limitations

The dissertation is subject to a number of limitations, which can be viewed in terms of its merits. The main limitations are outlined below while the specific limitations are discussed in each chapter. There are three main limitations.

First, the empirical results are based on European listed companies that were studied during a limited timeframe. The results cannot be generalized to other countries nor do they hold for Small and Medium Enterprises (SMEs). Further research should therefore focus on other home countries (e.g., US or emerging economies) as well as on SMEs to enhance the general applicability of the results. A longer study period would also strengthen generalizability of the results.

Second, it was not possible to collect all the variables for some firms. Hence, some companies that were part of the initial study sample had to be excluded, as discussed in each chapter. Multiple robustness tests were used to overcome this limitation in each chapter. Nevertheless, missing data might bias the results and potentially inflate confidence intervals. Additional research is required to verify whether the findings are stable under the conditions of complete samples.

Third, this dissertation has focused on FDI (greenfield investments). We chose this focus to isolate the effect of location choice and to exclude external prior influence. On the one hand, this approach ensures that no other external factors impact location choice, which would have biased the results. On the other hand, this selection biases the generalizability of the results. The findings therefore need to be tested in similar studies with a broader set of entry modes (e.g., licensing, strategic alliances, mergers). Such analyses would provide more insights into ICT and its impact on shared controlled entry modes.

Fourth, our ICT measurement (i.e., ICT spending per employee) is merely a proxy for ICT activities and lacks industry-specific profiles. Devaraj and Kohli (2003) observed that the impact of ICT varies depending on the industry. We controlled for industries, but future research should consider industry-specific ICT variables and focus on a single industry to improve the accuracy of results. The proxy used in this dissertation has the advantage of enabling observation of a cross-industry effect.

5 Closing remarks

The findings of this dissertation show that digitalization impacts international business on multiple levels. It suggests that international business scholars should start focusing more on the impact of digitalization since the field is (still) lagging behind others. The findings show on three layers that digitalization has the potential to strongly impact international business research and its related theories. Therefore, international business research should devote more effort to enhancing our understanding of the critical factors discussed here, not least because these are likely to help firms benefit from digitalization and internationalization at the same time.

Globalization has most probably not yet reached its limits and digitalization is just beginning to impact firms. Both trends may be expected to become increasingly important for firms and academic research. In particular the speed of innovation in digital technologies is fostering this trend. This dissertation provides a starting point for integrating two phenomena that still remain isolated. Hopefully, the present findings will be further translated into valuable contributions by other researchers. Overall, the author is confident that the importance of fundamentally understanding the interplay between digitalization and internationalization will increase even more in the coming years.

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- Devaraj, S. and Kohli, R. 2003. Performance impacts of information technology: Is actual usage the missing link? *Management Science*, 49(3):273–289.

6 Curriculum Vitae

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EDUCATION

HSG – University of St. Gallen

Ph.D. Candidate in Strategic Management
Institute for International Management

St. Gallen, CH
2017 - 2020

RUG – University of Groningen

Master of Science in International Business & Management
Average Grade: 8, Thesis Grade: 9 | 10.0 (best) – 5.0 (worst) | Cum laude – Top 5%

Groningen, NL
2014-2016

LSE – London School of Economics and Political Science

Certified Program, Business Analysis and Valuation
Average Grade: B | A+ (best) – F (worst)

London, UK
2015

University of Ravensburg – Weingarten

Bachelor of Engineering in Industrial Engineering
Average Grade: 2.5, Thesis Grade: 1.5 | 1.0 (best) – 5.0 (worst)

Ravensburg, DE
2010-2013

PROFESSIONAL EXPERIENCE

Sinpex GmbH

Founder and CEO

Sinpex enhances Compliance processes by applying cutting edge technology to save time, costs, and increase the risk assessment quality

Munich, DE
JAN 2018 - PRESENT

University of St. Gallen (HSG)

Research Assistant and Ph.D. Candidate

Project manager at the institute for international management (FIM)

- Software Development of an online platform for the research institute.
- Conceptualization and integration of digital business models.
- Responsible for the core database and for automation of FIM's core services.
- Supervision of Master and Bachelor theses (80% SIM Master students).

St. Gallen, CH
MAR 2017 - DEC 2020

Deloitte Consulting GmbH

Consultant

Worked on different national and international projects mainly in the financial sector

- Developed through self-initiative an algorithm which saved up to 70% of time in the risk assessment process for anti-money-laundering (AML) and KYC.
- Due to this algorithm, the project's strategic orientation changed and I became part of project management team and coordinated 40+ international consultants.
- The new role involved external stakeholder management, including the client's divisional board member and senior management.

Munich, DE
MAR 2016 - SEP 2017

INTERNSHIPS

RUG - University of Groningen

Student Consultant for Business Strategy

Worked with senior management of Dutch pharmaceutical company

- Market analyses and pricing strategies for a new product.
- Prepared market launch and marketing initiatives.

Groningen, NL

FEB 2015 - MAY 2015

Transsolar GmbH

Climate Engineering

Supported different international projects and proposals

- Analysed seasonal behaviour of sun, wind, heat, light and other energy flows in and around buildings.
- Worked closely with clients, formulated concepts based on the complex interdependency of the local climate, user needs, architectural design and engineered systems.

Munich, DE

JAN 2014 - SEP 2014

ZF Friedrichshafen AG

Technology Development (Automotive)

Micro magnetism surface analysing system project

- Supported research, simulation, experiment and analysed the results.
- Main responsibility for project controlling.

Friedrichshafen, DE

SEP 2012 - FEB 2013

SKILLS, LANGUAGES

Computer skills	Microsoft Word, Excel, PowerPoint (Advanced), Visual Basic (VBA) (Advanced), Bloomberg Terminal (Intermediate), Thomson Reuters Eikon (Intermediate)
Programming & Statistics	Stata (Advanced), Python (Intermediate), LaTeX (Intermediate)
Languages	German (mother tongue), English (C2)

AWARDS, SCHOLARSHIPS

Awards	Cum laude - Master degree received at the University of Groningen as award for being amongst the top 5%. In addition the master thesis was among the top 1%. HSG Entrepreneurial Talents 2018 of the University of St. Gallen. Four start ups become financially supported (4.000 CHF), coached, and trained by the chair of entrepreneurship and Startup@HSG. HSG Entrepreneurial Champions 2019 of the University of St. Gallen. Award for the top five individuals of the Entrepreneurial Talents programme over the last five years. This programme is run in cooperation with Swissnex, a programme of the Swiss federal department of economic affairs. The programme includes one week of coaching, training, and investor meetings in San Francisco and Silicon Valley.
Scholarships	EXIST 2018 - Scholarship by the European Union worth 135.000 EUR for innovative and technology based business ideas. Deloitte Consulting GmbH granted educational leave due to outstanding performance after one year of employment.

PERSONAL INTERESTS AND SOCIAL ENGAGEMENT

Personal Interests	Ski touring - climbed Mount Yotei (Japan) in 2016 Sailing - completed the high ocean yachting certificate in 2018
Volunteering & Leadership:	Managing director from 2007 to 2010 of a youth centre with more than 60 active members. Organized social events and workshops for teenagers.