



Digitalization, institutions and new venture internationalization

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ABSTRACT

This study examines the effect of digitalization on the internationalization of new ventures and further investigates the influence of a home country's presence of institutional voids and digital infrastructure on the extent of internationalization by new ventures, with the prediction that a home country's institutional voids and a weak digital infrastructure strengthen the positive relationship between new ventures' digitalization and internationalization. Applying multilevel modeling on a sample of more than 6000 entrepreneurs from 62 countries the study offers empirical support for these predictions. The findings are robust to alternative specifications. Entrepreneurs using the internet to sell their products and services are more likely to focus on customers in foreign markets when they face institutional voids and a lack of digital infrastructure in their home countries. The study contributes as follows: From a theoretical view, it provides a better understanding of the boundary conditions of the digitalization-new venture internationalization linkage. From a practical perspective, the findings of the study suggest the complementary roles of institutional voids and digital infrastructure at home to help entrepreneurs grow domestically and facilitate their internationalization.

1. Introduction

Digitalization has become increasingly relevant for businesses. Technologies that integrate information and communication in the workplace are beneficial for faster transport and the development of local and global networks (Neubert, 2018). It allows identifying and exploiting new opportunities, achieving efficiency and effective planning, enhancing problem-solving skills, and fostering decision-making in firms. Digitalization also contributes to efficient local adaptation and more client interaction, allowing to understand both old and new markets to the maximum (Autio, 2017; Coviello et al., 2017).

Literature has focused on the role of digital transformation in various industries (Baraldi and Nadin, 2006; Hesmondhalgh and Meier, 2018), in international experience (Dillon et al., 2020), and the impact of digitalization on international new venture performance (Jean et al., 2020; Sinkovics et al., 2013). Scholarship has increasingly examined the viability of digitalization on

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internationalization (Chen et al., 2019; Pergelova et al., 2019) and risks associated with internationalization (de Araújo Lima et al., 2020; Eduardsen and Marinova, 2020; Kim and Cavusgil, 2020). However, there is a gap in studies about how digitalization affects the internationalization of new ventures in different contexts. International new ventures are “start-ups that, from or near their founding, seek to derive a substantial portion of their revenue from the sale of products in international markets” (Cavusgil and Knight, 2015, p. 4). Although technologies like the internet provide new ventures the capabilities, they need to develop connections with international customers and suppliers, and theorizing about this abounds, there is little empirical evidence on the direct effect of internet use on international entrepreneurship (Etemad et al., 2010). As Autio (2017, p. 223) also points out, “[a] key contextual trend that is currently affecting patterns of new venture internationalization is that of digitalization. Yet, there has been little research exploring how digitalization challenges received internationalization frameworks and how it transforms INV [international new ventures] internationalization processes.”

A better understanding of the relationship between digitalization and new venture internationalization is therefore crucial, also because entrepreneurs increasingly apply information and communication technologies in their daily activities, either to analyze national and international market information, to sell products or services, or to reach out to potential customers, suppliers or strategic partners (Neubert, 2018; Rasmussen and Tanev, 2015; Tanev, 2017). This paper seeks to contribute to a better understanding of the digitalization-new venture internationalization linkage. By digitalization, we mean the use of digital infrastructure, the internet, as a medium for selling products and services (to create value for customers) (Autio, 2017; Baskerville et al., 2020; Laudon and Laudon, 2015; Nambisan et al., 2019). In the past, the costs associated with internationalization have been a significant barrier to entry for new ventures. Today, new businesses can internationalize at a lower cost through the internet (Autio, 2017; Laudon and Laudon, 2015; Nambisan et al., 2019). We, therefore, contend that entrepreneurs who use the internet and sell their products or services via the internet are more likely to internationalize their ventures. We argue that the internet is a resource for entrepreneurs that makes it easier for them to reach customers in foreign markets.

As the focus on home country characteristics helps to better comprehend the context in which entrepreneurial digital activities induce early internationalization decisions (Pathak et al., 2014; Muralidharan and Pathak, 2017), we also explore the boundary conditions of the relationship between digitalization and new venture internationalization. While established ventures are often better able to benefit from the home country institutional environment (Acquaah, 2007; Adomako et al., 2019; Khanna and Palepu, 2010) and may even make better use of home country resources for their internationalization, new ventures can be motivated to use digital tools to explore opportunities in the foreign market to escape an unfavorable institutional environment in their home country (Cuervo-Cazurra et al., 2019). Against this backdrop, we investigate the moderating roles of a home country's institutional voids. We hypothesize that entrepreneurs who use the internet to reach their customers and are in an unfavorable, institutionally, and structurally constrained environment are more likely to explore foreign market opportunities than entrepreneurs without digital strategies to reach customers (Jones, 2012). So even if we follow previous research that documents an adverse effect of domestic institutional voids on the internationalization of new ventures (e.g., Jean et al., 2020), we argue that the impact of institutional voids on internationalization is different for digital and non-digital entrepreneurs. We further hypothesize that a country's digital infrastructure plays an important moderating role. Typically, a country's digital infrastructure is assumed to facilitate the internationalization of ventures. For instance, Deng et al. (2022, p. 2) suggested that “advanced digital infrastructure in both home and destination markets reduces the transaction cost associated with information acquisition and processing, which enables the exporter to be more efficient and effective in responding to challenges in new foreign markets and in organizational learning.” Even if we think that Deng et al.'s assessment is valid, we take a complementary perspective in this study and claim that an advanced digital infrastructure can also attenuate the positive effect of entrepreneurs' usage of the internet on their internationalization, as a good domestic digital infrastructure makes it more likely that digital entrepreneurs focus on customers in their home markets.

In addition, we hypothesize that a country's digital infrastructure weakens the positive moderating effect of institutional voids on the positive relationship between new ventures' digitalization and internationalization. While the unfavorable institutional conditions of a home country should motivate digital entrepreneurs to find customers abroad, we assume that the need for digital entrepreneurs to internationalize is less pronounced in institutionally constrained environments if the home country can at least provide an advanced digital infrastructure. Good digital infrastructure makes it easier for digital new ventures to find customers in their home country, which is likely to weaken the motivation of digital new ventures to internationalize, even if they are located in an environment with poor institutions.

To test these hypotheses, we combine secondary data from the 2014 Global Entrepreneurship Monitor (GEM) with data from the World Bank, the Varieties of Democracy (V-Dem) project, and the Quality of Governance database. We apply multilevel modeling on a sample of more than 6000 entrepreneurs from 62 countries who own and manage a new venture that is less than 3.5 years old. For the sake of completeness, we also investigate the relationship for mature ventures that are more than 3.5 years old and test the robustness of our results with a number of different specifications.

In line with our theorizing, our results reveal that digitalization increases the internationalization of new ventures. Entrepreneurs who sell their products and services via the internet tend to be more internationalized. In addition, institutional voids and weak digital infrastructure in an entrepreneur's home country reinforce the positive relationship between the entrepreneur's internet use on internationalization. Our findings also confirm that a country's digital infrastructure weakens the positive effect institutional voids have on the relationship between digitalization and new venture internationalization. Thus, new ventures that use the internet to reach their customers internationalize less despite institutional voids when a digital infrastructure exists in the home country.

Our multi-country study contributes to the literature in two ways: First, we contribute to a better understanding of digitalization in entrepreneurship by exploring its effect on the internationalization of new ventures. Academic research on the link between digitalization and international entrepreneurship remains very limited and has been largely based on the activities of international new

ventures in developed markets (Jean et al., 2020). Our multi-country study fills this gap, thereby providing new insights on how digital technologies like the internet shape international start-up activities in countries with different levels of development. Second, we provide insight into the boundary conditions of home country characteristics that either constrain or facilitate the degree of internationalization of new ventures. Consequently, our study thus answers calls for more research to better understand the context of new venture internationalization (e.g., Autio, 2017). Finally, from a practical perspective, we emphasize the complementary roles of institutional voids and digital infrastructure at home for the growth of entrepreneurship domestically and their internationalization.

The paper is organized as follows: First, theoretical background information on new venture internationalization, digitalization, and institutional voids will be given, followed by a section in which we derive the hypotheses. Next, we will introduce the methodology and present the findings of our empirical analyses. The paper ends with a critical reflection of the study's findings, implications, limitations, and avenues for future research.

2. Theoretical background

2.1. New venture internationalization

Internationalization is understood as a firm's increasing involvement in international operations by shifting activities from its home market to global markets or adapting corporate strategy and activities for international markets (Acedo and Jones, 2007; Calof and Beamish, 1995; Welch and Luostarinen, 1988). International entrepreneurship, or so-called new venture internationalization, is the "discovery, enactment, evaluation, and exploitation of opportunities—across national borders—to create future goods and services" (Oviatt and McDougall, 2005, p. 5).

The level of new venture internationalization varies widely across countries worldwide (see Fig. A1 in the appendix). The interest of new ventures to expand abroad is motivated by many factors. Research shows that the economic and institutional characteristics of the home country play an important role (Aguilera and Grøgaard, 2019; Chowdhury and Audretsch, 2021; Sadeghi et al., 2019). Institutional quality and socio-economic development (Chen et al., 2018), a profit-seeking motivation (Reuber et al., 2018), limited growth in domestic markets (Fernández and Nieto, 2005), internal pressure, or limited resources in the home country (Gibson et al., 1997) have been shown to positively influence the internationalization of new firms. Networks (Reuber et al., 2018), location (Fernhaber et al., 2014), infrastructure (Callaway, 2004), an industry's maturity (Andersson, 2002), the technological and digital landscape, including the rise of the platform economy (Dillon et al., 2020; Monaghan et al., 2020; Shaheer and Li, 2020; Tolstoy et al., 2021), and the need for cost recovery for investments in new technologies (Qian and Li, 2003) influence the internationalization of new ventures too. Moreover, research documents the importance of international knowledge and experience for the internationalization of new ventures (Fernhaber et al., 2009; Fernhaber and McDougall-Covin, 2009; Glavas et al., 2017; Glavas and Mathews, 2014; Zaeafarian et al., 2016). For instance, Fernhaber and McDougall-Covin's (2009) study finds that venture capitalists play a vital role in the internationalization process through their knowledge and reputation.

International entrepreneurs can benefit from expanding into a foreign market by taking advantage of the opportunity to enter a new product market before competitors enter the market (Fernhaber et al., 2014; McDougall et al., 1994) in the process of gaining or increasing customer base, thereby increasing profitability (Bloodgood et al., 1996; Lu and Beamish, 2001; McDougall and Oviatt, 1996; Zahra et al., 2000), along with cost advantages of scale and scope economies, and unthreatened supply lines. Autio (2017, p. 211) points out that internationalization can also be used "strategically to build competitive advantage in the firm and its business model." In many cases, international demand for a product or service (Oviatt and McDougall, 1995) drives the internationalization of ventures.

In summary, the key drivers of new venture internationalization cover the following: The first is the role of home and host country institutional factors that influence new venture internationalization (Cuervo-Cazurra et al., 2019; Aguilera and Grøgaard, 2019; Sadeghi et al., 2019). External factors such as home country and host country industry and market conditions, formal and informal institutions, induce new venture internationalization (Julian and Ahmed, 2012; Muralidharan and Pathak, 2017; Sadeghi et al., 2019). The second is the role of social capital and networks in new venture internationalization. Research finds that higher social capital endowments are positively linked to the tendency of entrepreneurs to internationalize (Coviello and Munro, 1997; González and Massieu, 2021; Jones et al., 2011; Torkkeli et al., 2012). The third is the role of learning and knowledge of foreign markets. Access to knowledge about foreign markets, in addition to foreign market experience, is key to entry and superior performance in international business (Fernhaber et al., 2014; Jones et al., 2011; Musteen et al., 2014). Finally, the characteristics and orientation of entrepreneurs affect internationalization orientation, process, and their subsequent performance. Entrepreneurial characteristics (Robson et al., 2012), cultural traits, and cognitive processes (Butler et al., 2010) impact the likelihood and success of the internationalization of new ventures. In the next section, we will elaborate on digitalization and how it affects business activities.

2.2. Digitalization

Various definitions of digitalization exist. Tilson et al. (2010, p. 749) defined digitalization as "the sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural." Sørensen (2018) pointed out that digitalization included characteristics of network effects, usage of Big Data and algorithms, and caused risk related to competition. Autio (2017) referred to digitization as digital technologies and infrastructures that impact businesses and society.

The emergence of digitalization has indeed changed the way firms operate. Digitalization transforms and improves important business operations, organizational structures, production processes, and management concepts (Matt et al., 2015). New business

models are formed by the advantages of digital adoption, enabling firms to be more innovative, boost productivity and stay in close touch with customers (Downes and Nunes, 2013). Customer engagement has involved media platforms and inspired firms to rethink their strategies to put customers first by creating digital marketplaces. Daily operations in organizations have improved with the adoption of workplace technologies such as the Internet of Things (IoT), Big Data and cloud storage, and social media (Aral et al., 2013).

Without a doubt, the development of digital environments has enhanced the capabilities of ventures. Direct marketing is one of the aspects influenced by digitalization; mobile technology has allowed firms to improve postal mail and virtual communication delivery, which helped build closer relationships with customers and other stakeholders worldwide (Mort and Drennan, 2002). The connection of business to business (B2B) has also accelerated due to frequent interactions with network stakeholders brought by the advancement in digital technologies (Richard and Devinney, 2005; Pagani and Pardo, 2017). Supply chain management is being integrated through digitization to store large amounts of data and share information to further reduce costs, allowing smart devices to access manufacturing firms, for instance (Schniederjans et al., 2020; Feng and Shanthikumar, 2018). Also, enterprises are focusing on digital market entry by emphasizing the use of innovative technologies to gain access to international markets and reduce information asymmetries in target countries (Etemad et al., 2010; Pezderka and Sinkovics, 2011; Kontinen and Ojala, 2012). However, while benefits are associated with digitalization, there are also disadvantages. Digitalization has been linked to the exploitation of workers, power and wealth imbalances, cyber criminality, social media addiction, the surveillance of societies, or the possible threat of mass unemployment. So, the digital revolution also has adverse effects on individuals, organizations and societies, and thus has a dark side (Woodcock and Graham, 2019; Zuboff, 2015). We will now turn to the topic of institutions in the next section, to specifically examine how the lack of institutional quality affects the activities of young companies.

2.3. Institutional voids

Institutions have been defined as “the rules of the game in a society or humanly devised constraints that shape human interaction” (North, 1990, p. 3). These institutions include both formal and informal institutions (North, 1990; Scott, 1995). Thus, the concept of institutional voids (Khanna and Palepu, 1997) highlights the absence of or dysfunctionality in markets and formal institutions that affect the organization of economic activities (Khanna et al., 2005). Institutional voids generally occur in three major areas: “(a) the structural architecture of a formal institution, (b) market conditions, and (c) complementary mechanisms of cultural cognitive and proximate (formal) institutions” (Rana and Sørensen, 2021, p. 279). An institutional void in any of these areas can affect new venture internationalization. Institutional voids are present in environments where “institutional arrangements that support markets are absent, weak, or fail to accomplish the role expected of them” (Mair and Marti, 2009, p. 422). At the country level, such voids specifically reflect “the absence of the institutions that facilitate economic activity, as well as the absence of an associated set of rewards and sanctions to enforce those rules, norms and belief systems” (Tracey and Phillips, 2011, p. 31). For example, institutional voids such as political instability and corruption at the government levels, red tape, bureaucracy, administrative delays, lack of transparency, and a weak intellectual property rights regime in the home country could influence the ability of firms to explore and exploit market opportunities in the home country (Khanna and Palepu, 2010). When such formal institutions are constrained in their ability to provide these basic governance mechanisms, both transactional and operational costs are amplified, which inhibits both the creation and the effective functioning of markets (North, 1990). Further, when these formal institutions in the home country meant to monitor and enforce contractual adherence are weak, incentives to cheat are higher, leading to increased risks of opportunism in the home markets for firms (Williamson, 1985). Research has also suggested the role of informal institutions as complementary mechanisms along with formal institutions in facilitating and constraining entrepreneurial activity (Webb et al., 2020). A lack of informal institutions or informal institutional voids refers to “the inability of norms, values, and beliefs and their localized representations to facilitate stable, efficient, and effective transactions” (Webb et al., 2020, p. 505).

Increasing institutional voids in the home country increases an entrepreneur’s lookout for international markets where mechanisms to enforce policies, laws, regulations, economic rules regarding contracts, and appropriate norms of behavior and conventions exist (Baumol, 1990). In summary, institutional voids represent the absence or underdevelopment of societal institutions that facilitate economic or market activity (Doh et al., 2017), which could then induce entrepreneurs to explore international markets.

3. Hypotheses

3.1. Digitalization and new venture internationalization

The rise of information and communication technology (ICT) created opportunities for the internationalization of new ventures by changing their business model to generate revenue, improve strategies and capabilities leading to foreign market expansion. The use of ICT ensures a quicker and cheaper international expansion (Sinkovics and Penz, 2005). Due to technologies such as the internet, foreign market expansion is no longer cost-prohibitive for often under-resourced young and small ventures (Cavusgil and Knight, 2015). Indeed, the use of the internet and digital platforms allows entrepreneurs to identify and acquire international customers while staying in their home market (Coviello et al., 2017). Digital entrepreneurs can access global information more efficiently to understand better what (potential) customers want and expect, and with increasing country familiarity, it is easier to address the needs of foreign customers, offer internationally suitable products, and build a global brand image (Clark et al., 2018; Jones et al., 2011). However, even if the internet is a resource for entrepreneurs, helping them find suppliers, distributors, and customers, in addition to generating information about international markets on industry trends, technological developments, market regulations, and cultural

characteristics (Moen et al., 2008), which altogether support the internationalization of new ventures, digitalization also brings some challenges for ventures. For instance, activities such as finding customers, partners, and suppliers through a digital business model can mean huge investments of time and resources. Another challenge for entrepreneurs may be that they do not have the necessary digital skills or have difficulty hiring employees with the requisite skills (Eller et al., 2020). Likewise, Denicolai et al. (2021) find that Artificial Intelligence (AI) readiness is associated with the internationalization of small and medium-sized enterprises (SMEs). Despite such challenges, most research suggests rather a positive than a negative effect of digitalization on the internationalization of firms. Against this backdrop, we therefore follow the literature that states that digitalization offers entrepreneurs the potential to internationalize by providing easier and faster access to international market knowledge and quicker and cheaper transactions with customers and partners. We thus formulate our first hypothesis as follows:

Hypothesis 1. Digitalization is positively related to new venture internationalization.

3.2. The moderating role of institutional voids

Although there has been increased scholarly attention on institutional voids, a knowledge gap still exists in understanding the conditions in which institutional voids in the home country motivate new ventures to engage in business activities beyond their home markets (Adomako et al., 2019). We suggest that the positive effect of digitalization on new ventures' internationalization would be stronger in contexts that are institutionally constrained by the presence of institutional voids. In other words, institutional voids in the home country can favor or at least have less of a negative impact on the internationalization of digital new ventures compared to non-digital new ventures (McAdam et al., 2019).

Institutional voids, as discussed earlier, include uncertainty and ambiguity in the regulatory frameworks, government bureaucracy, inefficient rule and law enforcement mechanisms, improper factor markets, excessive red tape, and poor property rights protection (Khanna and Palepu, 2010). Such institutional voids increase transaction costs for ventures to do their business; for example, ventures find it difficult to plan their strategies when market regulations keep changing frequently; they would need to spend considerable resources to adhere to such regulations, i.e., obtaining permits and getting past the red tape (Hoskisson et al., 2000). In summary, lack of transparency, weak intellectual property rights, bureaucratic red tape, administrative delays, and corruption are characteristics of institutional voids that constrain an entrepreneur's ability to explore and exploit both their home and foreign market opportunities. Chen et al. (2018) document a positive effect of institutional quality on the internationalization of ventures. Thus, institutional voids may negatively affect internationalization but should less so if the venture applies digital strategies to reach customers abroad. Digitalization facilitates new ventures to leverage the internet for internationalization processes, thereby facilitating easy access to knowledge on global markets, improving efficiencies of international market transactions, and developing and maintaining international relationships with stakeholders (Glavas and Mathews, 2014). Therefore, institutional voids will have less of a negative impact on digital new ventures than on non-digital new ventures in their international endeavors.

We can even assume that institutional voids may stimulate greater internationalization. Researchers have suggested digitalization as a means for ventures wanting to internationalize to overcome challenges that exist in an institutional environment (McAdam et al., 2019). It is argued that in such contexts, digital platforms (e.g., online B2B markets) could help entrepreneurs overcome institutional voids in their home economy and serve as an alternative export intermediary (Jean et al., 2020). When confronted by such institutional voids, entrepreneurs tend to get frustrated and therefore look for opportunities in international markets as an escape route from their home country constraints (Adomako et al., 2019). Extant literature that examined firms from emerging markets suggests that firms use internationalization as a strategy to overcome challenges of doing business in their home countries due to institutional voids (Aguilera et al., 2017; Chittoor et al., 2008; Kumar et al., 2013). By establishing their international markets operations, such firms can reduce their dependency on their volatile and uncertain home markets and gain access to resources unavailable at home (Brenes et al., 2019). New ventures located in such institutionally constrained environments can be motivated to explore foreign market opportunities (Jones, 2012). However, such ventures would face a lack of international knowledge, access to international clients, and networks required to succeed internationally. Digitalization, we argue, could be one of the means for entrepreneurs to overcome such problems. In other words, while new ventures would need to make efforts to access such international market intelligence (i.e., market knowledge, access to international clients and networks) in order to internationalize, digitalization would facilitate this process of access to international market knowledge. As such, extant research has suggested that international market intelligence mediates the relationship between digitalization and internationalization (Pergelova et al., 2019). Accordingly, with greater institutional voids, it can be much more difficult for entrepreneurs who do not employ digital strategies to reach customers abroad than for digital entrepreneurs.

Against this background, we formulate our next hypothesis as follows:

Hypothesis 2. Institutional voids positively moderate the relationship between digitalization and new venture internationalization, such that the positive relationship between digitalization and new venture internationalization is stronger in countries with higher levels of institutional voids.

3.3. The moderating role of digital infrastructure

Digital infrastructures can be defined "as shared, unbounded, heterogeneous, open, and evolving socio-technical systems comprising an installed base of diverse information technology capabilities and their user, operations, and design communities" (Hanseth and Lyytinen, 2016, p. 4). Digital infrastructures cannot be characterized through a specific set of functions (e.g., specific

systems) or strict boundaries (e.g., applications). Rather, digital infrastructure is relational in nature and is characterized by dynamism and longevity. Digital infrastructures “are built on the notion that they are never fully complete, that they have many uses yet to be conceived of, and that the public and ordinary organizational members can be trusted to invent and share good uses” (Zittrain, 2008, p. 43). Thus, ventures build and leverage digital infrastructure to communicate and collaborate with computing capabilities that help the venture deploy its digital business model online. In all, digital entrepreneurs operate to a very large extent using technology, forgoing brick and mortar spaces; consequently, their connection to international markets is nearly instantaneous.

A country’s digital infrastructure is seen as a stable enabling mechanism needed to ensure competitiveness, boost growth and expand economic opportunities (Lyytinen and King, 2006; World Bank, 2016). As an aspect of a country’s entrepreneurial ecosystem, a digital infrastructure also directly influences the development, level, and form of entrepreneurial activity for a given geography. With respect to the relationship between digitalization and new venture internationalization, a weak digital infrastructure—with slow internet, no digital business platforms, few digital customers, or job opportunities in the digital sector—is typically seen as a barrier to entrepreneurs seeking to internationalize. We generally agree that an advanced digital infrastructure facilitates the internationalization of new ventures. However, we also suggest that an advanced infrastructure in the home country also incentivizes entrepreneurs to sell their own products and services through the internet in the home country first. If customers, partners and other stakeholders can easily be reached in the home country, there is probably less need for digital entrepreneurs to seek opportunities abroad. An excellent digital infrastructure probably makes a digital entrepreneur less dependent on foreign markets. They can initially focus on their home markets, which they know better and closer and have better access to, resulting in lower transaction costs and risks. Consequently, there should be a weaker effect of entrepreneurs’ digitalization on their international orientation in countries with a more advanced digital infrastructure. Conversely, digital entrepreneurs should feel a greater need to internationalize if they live in countries with slow internet and a lack of digital platforms and e-commerce opportunities, or when people are either not online or do not prefer to buy products and services over the internet. Also, an advanced digital infrastructure may also facilitate the internationalization of non-digital new ventures, resulting in a smaller internationalization gap between digital new ventures and non-digital new ventures. Therefore, we formulate our third hypothesis as follows:

Hypothesis 3. Digital infrastructure positively moderates the relationship between digitalization and new venture internationalization, such that the positive relationship between digitalization and new venture internationalization is weaker in countries with a more advanced digital infrastructure.

We also hypothesize that the moderating effect of institutional voids on digitalization and new venture internationalization is dependent on a home country’s digital infrastructure. We have argued that digital new ventures, compared to their non-digital counterparts, will more likely internationalize if they are embedded in countries with low-quality formal institutions. Institutional voids make it more difficult for non-digital ventures to operate abroad, while digital ventures have quicker and easier access to foreign customers. Also, when institutional voids impede entrepreneurial activity in the home country, it can motivate digital entrepreneurs to use the internet to overcome unfavorable institutional constraints. We have also argued above that digital entrepreneurs are less likely to go abroad if their home countries offer an excellent digital infrastructure. The existence of a well-functioning internet, digital platforms and digital customers should motivate digital entrepreneurs to sell their products and services in their own country on a larger scale than they otherwise would if there were no sufficient digital infrastructure in their home country. Taking the two arguments together, we can assume that an advanced digital infrastructure cushions the institutional incentives for digital entrepreneurs to enter foreign markets. This means that, despite the presence of institutional voids, digital entrepreneurs are more willing to sell their products and services in their home countries if they can benefit from a well-developed digital infrastructure. This should result in a smaller internationalization gap between digital and non-digital new ventures. Against this background, we formulate our last hypothesis as follows:

Hypothesis 4. The positive moderating effect of institutional voids on the relationship between digitalization and new venture internationalization is weaker in countries with a strong digital infrastructure.

Fig. 1 shows our conceptual framework.

4. Data and methods

4.1. Data collection

We combine individual- and country-level data from various sources to test our hypotheses. The main data come from the Global Entrepreneurship Monitor’s (GEM) Adult Population Survey (APS) database, which is a large population-representative survey that allows investigating the antecedents and outcomes of entrepreneurial activity. In each year, GEM interviews individuals around the world over the phone or face-to-face (Chen et al., 2018), asking mandatory questions, which are surveyed each year, as well as special topic questions such as social entrepreneurship, intrapreneurship, immigrant entrepreneurship or finance, among others (Brieger and Gielnik, 2021; Hörisch et al., 2017; Reynolds et al., 2005). In 2014, the GEM APS included an item related to entrepreneurs’ use of the internet to sell products and services to customers.¹ As we are interested in the effect of digitalization on the internationalization of

¹ To our knowledge, there is no alternative database that allows examining the impact of entrepreneurs’ digitalization on outcomes from a cross-country perspective.

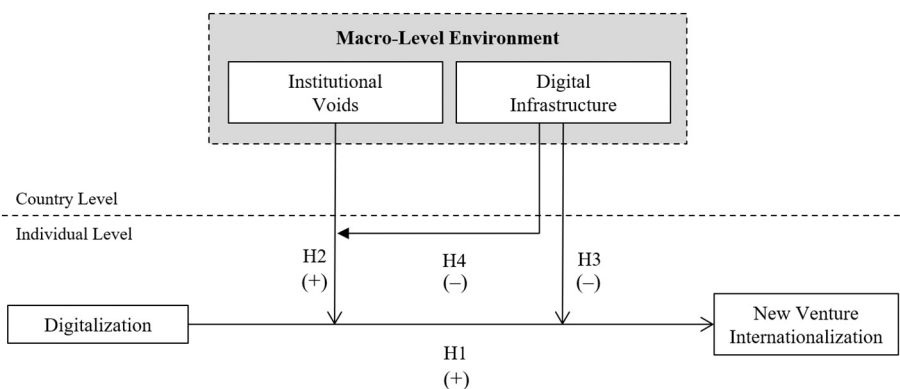


Fig. 1. Conceptual framework.

new ventures, we selected from the database those respondents who are either managers (variable: *babybusm*) or manager-owners (variable: *babybuso*) of a business that is less than 42 months old. We identified 11,576 current individual entrepreneurs. In the next step, we added country-level data from the OECD, World Bank, V-Dem, and Quality of Governance with the GEM data and excluded all respondents for whom we lacked either individual or country-specific data. Our final sample consists of 6165 entrepreneurs from 62 countries.

4.2. Measures

4.2.1. New venture internationalization

The dependent variable, which is obtained from the GEM survey, captures a firm's internationalization intensity. Respondents were asked the question: "What proportion of your customers will normally live outside your country? Is it more than 90%, more than 75%, more than 50%, more than 25%, more than 10%, or 10% or less or none?" We coded the dependent variable as follows: 1 = none, 2 = 10% or less, 3 = 11 to 25%, 4 = 26 to 50%, 5 = 51 to 75%, 6 = 76 to 90%, and 7 = more than 90%. The item has already been used in previous research (e.g., Li, 2018; Muralidharan and Pathak, 2017).

4.2.2. Digitalization

This independent variable also comes from GEM and captures whether the entrepreneur uses the internet to sell products or services. Respondents were asked, "Do you use the internet to sell products or services for your business?" We coded digitalization as 1 if the answer was "yes" and 0 if the answer was "no." To our knowledge, this variable has not been used in previous studies.

4.2.3. Institutional voids

We use a composite index that captures a country's institutional voids. The multi-item index contains indicators from the World Bank Governance Surveys—namely regulatory quality, control of corruption, voice and accountability, rule of law, governance effectiveness and political stability, and absence of violence and terrorism. These indicators have often been used in the literature to measure formal institutional quality (Garrone et al., 2019; Ngobo and Fouda, 2012; White et al., 2019). The World Bank indicators were reversed and normalized on a scale, ranging from 0 for low levels of institutional voids and 1 for higher levels of institutional voids. The data come from the year 2014.

4.2.4. Digital infrastructure

This variable provides a comprehensive picture of technology diffusion and measures a country's level of digital adoption in the areas of business and people (World Bank, 2016). To measure digital infrastructure, we calculated for each country in our sample the average of World Bank's Business Adoption Index and People Adoption Index ($\alpha = 0.95$). The Business Adoption Index is based on four normalized indicators: the number of secure servers, the speed at which files are downloaded, 3G coverage, and the share of firms with websites. The People Adoption Index is based on the two normalized indicators: mobile access at home and internet access at home. Each subindex is measured on a 0–1 scale, with higher values indicating a stronger adoption rate for firms or individuals, respectively. The index data were taken for 2014. Because the World Bank's data on digital adoption is only available for 2014 and 2016, there is not much research using this data, with a few exceptions (e.g., Shapiro and Mandelman, 2021; Skare and Soriano, 2021).

4.2.5. Control variables

In accordance with prior cross-country research, we include several individual and country-level control variables. At the individual level, we control for entrepreneur's gender (female = 1, male = 0), age (continuous), education (five categories: none, some secondary, secondary degree, post-secondary, and graduate), household income (three categories: lower 33%, middle 33%, and upper 33%), start-up skills ("Do you have the knowledge, skill and experience required to start a new business?" yes = 1, no = 0) and fear of failure ("Fear of failure would prevent you from starting a new business" yes = 1, no = 0). Previous research shows that female gender

is negatively related, while education, income and start-up skills are positively related to the internationalization of new ventures (Chen et al., 2018; Giotopoulos et al., 2017; Li, 2018; Muralidharan and Pathak, 2017). Age and fear of failure show rather insignificant associations with new venture internationalization in most studies, but both variables have been shown to be highly relevant in entrepreneurship research (Brieger et al., 2021; Chen et al., 2018; Wennberg et al., 2013).

At the country level, we control for gross domestic product (GDP) per capita, measured in constant 2010 U.S. dollars, GDP growth, and trade as a percentage of GDP. Research documents a negative relationship between GDP and new venture internationalization, and positive associations of GDP growth and trade openness with new venture internationalization (De Clercq et al., 2008; Hessels et al., 2008a, 2008b).

For the robustness checks, alternative measures were considered. First, we used two alternative new venture internationalization measures. Following Hessels et al. (2008a, 2008b), we created a weak and a strong new venture internationalization measure. Weak new venture internationalization is coded as 1 if the respondent reported that at least 1% of the customers come from other countries, and 0 if no customers come from a foreign country. Strong new venture internationalization is coded as 1 if the respondent reported that at least 26% of the customers come from other countries, and 0 if the new venture has 25% or fewer overseas customers. Second, to ensure that no single indicator of our institutional voids index drives the outcome, we provide the results with each indicator of the institutional voids index. In addition, we report results for indicators coming from the Fragile State Index, which also captures a country's institutional voids. Third, we use internet usage (% of the population) as an alternative measure for the digital infrastructure. Fourth, for one robustness check, we consider an industrial sector variable containing 12 different sectors.

Tables A1 and A2 in the Appendix list the countries involved in the study and a description of the variables and their sources.

Table A2

Variables.

Variable	Description
<i>Individual-level variables</i>	(for each entrepreneur) Source: GEM
New venture internationalization	Intensity of a venture's internationalization based on the question: "What proportion of your customers will normally live outside your country? Is it more than 90%, more than 75%, more than 50%, more than 25%, more than 10%, or 10% or less or none?" We coded the dependent variable as follows: 1 = none, 2 = 10% or less, 3 = 11 to 25%, 4 = 26 to 50%, 5 = 51 to 75%, 6 = 76 to 90%, and 7 = more than 90%.
Digitalization	Entrepreneur uses the internet to sell products or services for the business (no = 0, yes = 1).
Gender (female)	Reported gender (male = 0, female = 1).
Age	Age in years (continuous).
Education	No educational background (= 0), some secondary education (= 1), secondary education (= 2), post-secondary education (= 3), or graduate experience (= 4).
Household income	Lowest third (= 0), middle third (= 1), or upper third (= 2) household income distribution in the country of living.
Start-up skills	Has knowledge, skill, and experience to start a business (no = 0, yes = 1).
Fear of failure	Would not start a business out of fear of failure (no = 0, yes = 1).
<i>Country-level variables</i>	
GDP per capita	Gross domestic product per capita (constant 2010 US\$), divided by 1000. Source: World Bank/V-Dem, data from 2013 data.
GDP growth	GDP growth per capita (annual %). Source: World Bank/V-Dem, data from 2013.
Trade (% of GDP)	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product. Source: Quality of Governance, data from 2014.
Digital infrastructure	Average of World Bank's digital adoption index business and digital adoption index people. Source: World Bank, data from 2014.
Institutional voids	Based on World Bank's six governance indicators: (1) voice and accountability, (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of law and (6) control of corruption. The indicators were reversed and normalized on a scale, ranging from 0 for low levels of institutional voids and 1 for higher levels of institutional voids. The indicator scores were added, then divided by the number of indicators. Source: World Bank/V-Dem, data from 2014.
<i>Robustness check variables</i>	
Weak new venture internationalization	Venture has a weak international orientation – 1% and more of customers from outside country (= 1, 0 = below 1%). Source: GEM
Strong new venture internationalization	Venture has a strong international orientation – more than 25% of customers from outside country (=1, 0 = below 26%). Source: GEM
Industry	Entrepreneur's venture belonging to an industry (ISIC). Source: GEM
Internet usage (% of population)	Individuals using the internet (% of population). Source: Quality of Governance, data from 2014
Security apparatus	Index that captures security threats to a state (e.g., bombings, battle-related deaths, rebel movements, coups, or terrorism), organized crime and homicides, and perceived trust of citizens in domestic security. Source: The Fund for Peace, data from 2014
State legitimacy	Index takes into account distrust in political processes, the level of political opposition (demonstrations, riots), corruption, lack of openness and fairness in the political process (e.g., political rights, leadership transitions, government representativeness). Source: The Fund for Peace, data from 2014
Public services	Index captures the quality of public services, health and education system, shelter, and infrastructure. Source: The Fund for Peace, data from 2014
Human rights	Index considers civil and political rights and freedoms, the level of openness (e.g., free media), violation of rights (e.g., torture, child labor, forced labor), equality and a fair legal system

4.3. Data analysis

As our dataset has a hierarchical structure, with individual data (level 1) embedded in countries (level 2), we employed multilevel modeling, which considers the nested data structure and simultaneously estimates the variability in the dependent variable within and between countries (Snijders and Bosker, 2012). Ignoring the nested data structure and thus the interdependency between the two levels can result in artificial significant effects due to biased standard errors. To prove if multilevel modeling is necessary, we calculated the null model's ICC value to identify the variation in our dependent variable associated with differences between countries. An ICC value of 0.2735 reveals that nearly 27.35% of the variance in new venture internationalization occurs between countries, which is considered as large in business research (Hox, 2010). For the models with the ordinal categorical dependent variable, we use the “meologit” command; for the models with binary outcomes, the “melogit” command in Stata. Moreover, for an easier interpretation of the results, we also z-standardized all country-level predictors, in line with previous research (Brieger et al., 2019; Pathak and Muralidharan, 2016).

5. Results

5.1. Main results

Tables 1 and 2 contain the descriptive statistics and bivariate correlations among the variables. Approximately 25% of the entrepreneurs have an international orientation (no proportion of your foreign customers: 75.28%, 10% or less foreign customers: 15.78%, 11 to 25% foreign customers: 3.07%, 26 to 50% foreign customers: 2.22%, 51 to 75% foreign customers: 1.62%, 76 to 90% foreign customers: 0.79%, more than 90% foreign customers: 1.23%). Nearly 26% of the entrepreneurs say they sell their products and services over the internet. Results of the correlation analysis reveals a positive relationship between digitalization and new venture internationalization ($r = 0.24, p < .01$). New venture internationalization is also positively associated with age ($r = 0.04, p < .01$), education ($r = 0.19, p < .01$), household income ($r = 0.08, p < .01$), start-up skills ($r = 0.06, p < .01$), GDP per capita ($r = 0.24, p < .01$), trade as % of GDP ($r = 0.26, p < .01$) and digital infrastructure ($r = 0.21, p < .01$), and negatively associated with female gender ($r = -0.09, p < .01$), fear of failure ($r = -0.03, p < .01$) and institutional voids ($r = -0.28, p < .01$). Fig. 2 shows that countries with more advanced digital infrastructure and fewer institutional voids have, on average, a higher level of new venture internationalization.

Table 3 presents the main results. Model 1 includes only the control variables. Model 2 adds the independent variable, digitalization, to test Hypothesis 1. Model 3 features the interaction term of digitalization and institutional voids to test Hypothesis 2. Model 4 includes the interaction term of digitalization and digital infrastructure to test Hypothesis 3. Model 5 adds the three-way interaction. We use the same order also for the robustness analyses.

Results of Model 1 show that respondents are engaged in the internationalization of new ventures when they are not female ($b = -0.213; p < .01$), have secondary ($b = 0.233; p < .1$), post-secondary ($b = 0.497; p < .01$) or tertiary education ($b = 0.732; p < .01$), and belong to middle ($b = 0.224; p < .05$) or upper household income categories ($b = 0.318; p < .01$). Entrepreneurs are also more internationalized in countries marked by higher GDP per capita ($b = 0.298; p < .05$) and trade activity levels ($b = 0.008; p < .01$). Model 2 reveals a significant and positive relationship between digitalization and new venture internationalization ($b = 0.637; p < .01$), showing that entrepreneurs who use the internet to sell products or services have more likely customers in foreign countries. Thus, Hypothesis 1 finds support. As the results of Model 3 indicate, institutional voids strengthen this relationship between being digital to sell products and services and new venture internationalization ($b = 0.292; p < .01$). Accordingly, digital ventures have more likely than non-digital ventures an international outlook when they are in a country with low-quality institutions, supporting Hypothesis 2. We also find support for Hypothesis 3, as Model 4's results show a significant and negative interaction of digitalization and digital infrastructure on new venture internationalization. Thus, a strong digital infrastructure buffers the positive relationship between a new venture's digitalization and internationalization ($b = -0.351; p < .01$). Finally, we find evidence for the existence of a negative three-way interaction effect ($b = -0.222; p < .01$), in support of Hypothesis 4. This indicates that entrepreneurs are less likely to have a foreign customer base when they live in a country characterized by strong institutional voids and a good digital

Table 1
Descriptive statistics.

Variable	N	M	SD	Min	Max
New venture internationalization	6165	1.464	1.080	1	7
Digitalization	6165	0.258	0.438	0	1
Gender (female)	6165	0.479	0.500	0	1
Age	6165	37.249	12.009	18	86
Education	6165	1.724	1.152	0	4
Household income	6165	1.026	0.838	0	2
Start-up skills	6165	0.800	0.400	0	1
Fear of failure	6165	0.289	0.454	0	1
GDP per capita	6165	18,798.970	21,245.670	1452.000	148,807.000
GDP growth	6165	0.013	0.027	-0.086	0.162
Trade (% of GDP)	6165	65.771	43.007	24.685	392.804
Digital infrastructure	6165	0.514	0.186	0.180	0.903
Institutional voids	6165	0.592	0.251	0	1

Table 2

Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. New venture internationalization	1												
2. Digitalization	0.24	1											
3. Gender (female)	−0.09	−0.10	1										
4. Age	0.04	0.03	−0.01	1									
5. Education	0.19	0.37	−0.09	0.00	1								
6. Household income	0.08	0.22	−0.13	0.01	0.22	1							
7. Start-up skills	0.06	0.11	−0.09	0.00	0.13	0.12	1						
8. Fear of failure	−0.03	−0.05	0.11	0.03	−0.02	−0.08	−0.25	1					
9. GDP per capita	0.24	0.34	−0.11	0.12	0.30	0.15	0.03	−0.03	1				
10. GDP growth	−0.01	−0.03	0.05	0.03	0.07	−0.01	−0.02	0.05	−0.23	1			
11. Trade (% of GDP)	0.26	0.20	−0.06	0.09	0.27	0.02	0.05	−0.02	0.30	−0.08	1		
12. Digital infrastructure	0.21	0.39	−0.05	0.24	0.38	0.17	−0.03	0.06	0.63	0.01	0.30	1	
13. Institutional voids	−0.28	−0.40	0.07	−0.21	−0.34	−0.13	−0.06	0.03	−0.61	0.10	−0.38	−0.82	1

Notes: Correlations in bold are significant at 1% level. $N = 6165$.

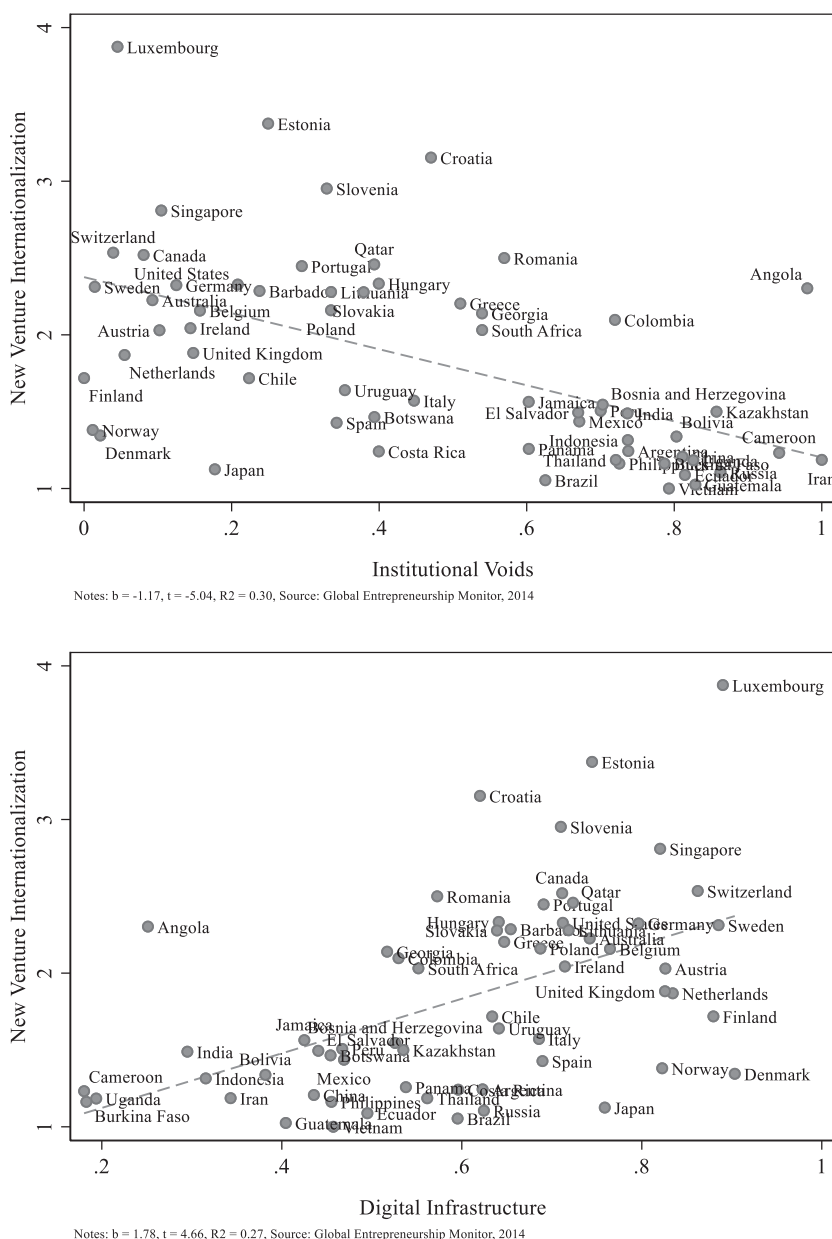


Fig. 2. Country-level relationships.

infrastructure. We graph the discussed moderating effects in Fig. 3.

5.2. Robustness check results

We run several robustness checks to test the robustness of our theorizing and findings. First, we checked whether our results are robust when controlled for the industry. The results of Table 4 indicate that this is indeed the case. We find similarly strong coefficients and the same significant levels, with the exception that the three-way interaction effect is now significant at the 5% level.

Second, we further rerun the focal analysis with an alternative variable that captures a country's digital infrastructure, internet usage (% of the population). As Table 5 shows, we find the same effects with this alternative digital infrastructure measure. Internet usage negatively moderates and thus buffers the positive relationship between digitalization and new venture internationalization. Moreover, we find a significant negative three-way interaction effect, similar to our focal analysis.

Third, to check that our institutional voids' effects are not driven by single components of our institutional voids index, we rerun the analysis with all single components of our formative institutional voids index and four additional indicators from the Fragile State

Table 3
Main results.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.213***	−0.200***	−0.197***	−0.197***	−0.197***
Age	−0.003	−0.002	−0.002	−0.002	−0.002
Education (ref is none)					
Some secondary	0.215	0.211	0.176	0.168	0.173
Secondary degree	0.233*	0.150	0.090	0.083	0.087
Post-secondary	0.497***	0.332**	0.260*	0.254*	0.257*
Graduate experience	0.732***	0.536***	0.494***	0.491***	0.491***
Household income (ref is low)					
Middle	0.224**	0.199**	0.196**	0.198**	0.207**
High	0.318***	0.263***	0.259***	0.261***	0.277***
Start-up skills	0.085	0.052	0.041	0.043	0.043
Fear of failure	−0.035	−0.017	−0.016	−0.021	−0.017
<i>Country-level controls</i>					
GDP per capita	0.298**	0.240*	0.014	0.075	0.106
GDP growth	−0.007	−0.011	0.034	−0.011	0.060
Trade (% of GDP)	0.008***	0.007***	0.005**	0.006**	0.005**
<i>Independent variable</i>					
Digitalization		0.637***	0.823***	0.835***	0.672***
<i>Moderators</i>					
Institutional voids			−0.554***		−0.961***
Digital infrastructure				0.463**	−0.347
<i>Interaction effects</i>					
Digitalization × institutional voids			0.292***		0.379**
Digitalization × digital infrastructure				−0.351***	−0.120
Institutional voids × digital infrastructure					0.270**
Digitalization × institutional voids × digital infrastructure					−0.222***
Country-level variance	0.980***	0.949***	0.876***	0.967***	0.832***
Slope (digitalization)			0.069	0.096	0.018
Akaike information criterion	9049.2	8986.8	8965.9	8970.7	8963.9
VIF	2.06	2.07	2.36	2.42	6.77
Log likelihood	−4504.6	−4472.4	−4458.0	−4460.3	−4453.0
Chi squared	98.5	164.0	166.2	152.2	197.2

Notes: Dependent variable is new venture internationalization. Observations: 6165 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

Index database. The variables are coded in such a way that higher values indicate stronger institutional voids. Table 6 shows that each measure that captures an area of low institutional quality positively moderates and thus strengthens the relationship between new ventures' digitalization and internationalization.

Fourth, given the strong positive correlation between low economic wealth and institutional voids on the country level, one may argue that not a home country's institutional characteristics but rather economic conditions moderate the relationship between digitalization and new venture internationalization. Therefore, we employed a model in which we included two interaction terms, one interaction term with institutional voids and one interaction term with GDP per capita. The results presented in Table 7 reveal that the interaction term with institutional voids remains significant, while the interaction term with GDP per capita is not significant when both interaction terms are included in the same estimate. Thus, we conclude that not a country's economy, but rather institutional conditions play a vital role in the relationship between digitalization and new venture internationalization.

Fifth, given that our main analysis is based on a sample with managers and managing owners of a venture that is up to 3.5 years old, we rerun our analysis with additional two samples. One sample includes only so-called nascent entrepreneurs, which have not yet founded their business and have not yet received any wages but are actively involved as an owner in start-up efforts. The second sample includes only managers and manager-owners from established ventures that are older than 3.5 years. Results presented in Tables 8 and 9 show the robustness of our findings, with the limitation that we could not find significant three-way interaction effects for both samples. However, the positive association of digitalization and new venture internationalization as well as the moderating effects of institutional voids and digital infrastructure, are strongly robust across specifications.

Finally, we rerun our focal analysis with two alternative new venture internationalization measures that capture weak and strong export orientation. As presented in Table 10, the results for the weak new venture internationalization measure are largely identical in

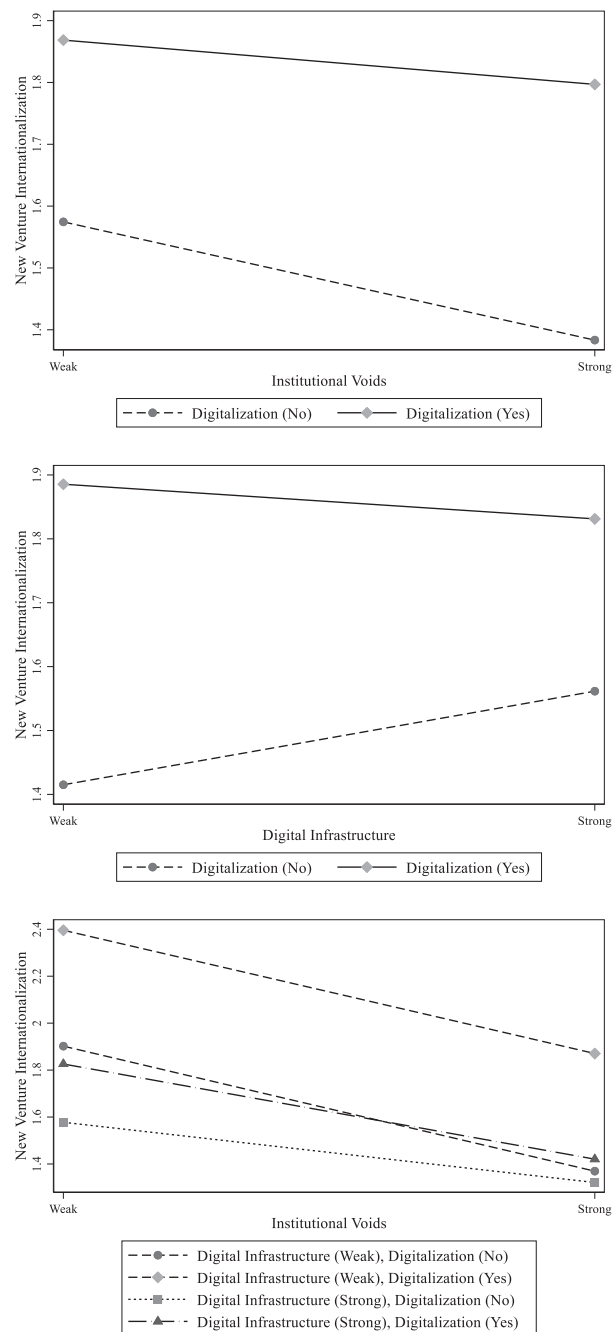


Fig. 3. Interaction graphs.

terms of effect size and significance level. Likewise, we get similar results for strong new venture internationalization, as Table 11 shows. The only difference is that we cannot find a significant three-way interaction effect, even though the sign points in the same direction as in our focal analysis. In sum, we conclude that our findings are robust for a number of different specifications.

6. Discussion

6.1. Discussion of findings

Digitalization has been touted with an increasing role for the success of international new ventures because of its potential to reduce costs, acquire new customers and partners, and improve communication with different stakeholders. However, empirical

Table 4

Robustness check results 1: controlled for industry.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.217***	−0.203***	−0.202***	−0.203***	−0.203***
Age	−0.003	−0.002	−0.002	−0.002	−0.002
Education (ref is none)					
Some secondary	0.169	0.172	0.143	0.132	0.144
Secondary degree	0.225*	0.147	0.090	0.084	0.095
Post-secondary	0.499***	0.357**	0.294**	0.286**	0.298**
Graduate experience	0.711***	0.554***	0.523***	0.519***	0.521***
Household income (ref is low)					
Middle	0.226**	0.202**	0.199**	0.199**	0.212**
High	0.330***	0.282***	0.275***	0.276***	0.293***
Start-up skills	0.059	0.026	0.016	0.018	0.021
Fear of failure	−0.021	−0.009	−0.006	−0.012	−0.007
Industry	Yes	Yes	Yes	Yes	Yes
<i>Country-level controls</i>					
GDP per capita	0.312**	0.261**	0.012	0.066	0.116
GDP growth	0.000	−0.003	0.052	0.000	0.066
Trade (% of GDP)	0.008***	0.008***	0.005**	0.006**	0.006***
<i>Independent variable</i>					
Digitalization		0.650***	0.842***	0.855***	0.735***
<i>Moderators</i>					
Institutional voids			−0.612***		−0.975***
Digital infrastructure				0.527***	−0.336
<i>Interaction effects</i>					
Digitalization × institutional voids			0.304***		0.365**
Digitalization × digital infrastructure				−0.361***	−0.109
Institutional voids × digital infrastructure					0.258**
Digitalization × institutional voids × digital infrastructure					−0.173**
<i>Country-level variance</i>					
Slope (digitalization)	1.026***	0.994***	0.884***	0.993***	0.777***
Akaike information criterion	8689.9	8628.8	8606.7	8613.1	8603.9
VIF	1.58	1.59	1.68	1.71	2.62
Log likelihood	−4314.0	−4282.4	−4267.3	−4270.5	−4264.0
Chi squared	111.9	175.6	194.6	171.1	224.6

Notes: Dependent variable is new venture internationalization. Observations: 5961 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). The three-way interaction model could not be estimated with a random slope (due to “non concavity”). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

evidence on the effects of new ventures’ digitalization on their internationalization is largely missing (Jean et al., 2020; Pergelova et al., 2019). We address this research gap by investigating the direct effect of internet use to sell products and services, one aspect of digitalization, on entrepreneurial internalization, and the boundary conditions of home country characteristics that facilitate or constrain the degree of early internationalization by new ventures.

The purpose of this study was to examine the effect of digitalization on new ventures’ internationalization. In Hypothesis 1, we hypothesized that digitalization has a positive influence on new ventures’ internationalization. We were able to support our hypothesis, and the result is in line with existing basic ideas in research that digitization can positively contribute to the internationalization of new businesses (Jean et al., 2020), for which, however, empirical evidence is lacking so far. Our result is in line with research showing that e-commerce usage positively affects the international intensity of SMEs (Eduardsen, 2018). The study by Eduardsen (2018) suggests that SMEs use the internet as a medium for internationalization. Our results also indicate that new ventures are more engaged in internationalized activities when they sell their products and services to customers over the internet. Digitalization makes it easier for new ventures to reach customers abroad. The possibility to reach customers over long distances using the internet facilitates entrepreneurs to internationalize. Digitalization increases and facilitates interactions with customers, improves customer experience, and helps entrepreneurs access relevant information efficiently and timely. Our findings also contradict thinking on the possible negative effects of a country’s digital infrastructure. For instance, Sinkovics et al. (2013) suggest that international new ventures that rely too much on the internet may fall into the “virtually trap.” In addition, digitization can come at a huge cost, as

Table 5
Robustness check results 2: with an alternative digital infrastructure measure.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.213**	−0.200**	−0.197**	−0.198**	−0.197**
Age	−0.003	−0.002	−0.002	−0.002	−0.002
Education (ref is none)					
Some secondary	0.215	0.211	0.176	0.168	0.175
Secondary degree	0.233*	0.150	0.090	0.087	0.084
Post-secondary	0.497**	0.332**	0.260*	0.255*	0.258*
Graduate experience	0.732**	0.536**	0.494**	0.491**	0.484**
Household income (ref is low)					
Middle	0.224**	0.199**	0.196**	0.197**	0.206**
High	0.318**	0.263**	0.259**	0.259**	0.272**
Start-up skills	0.085	0.052	0.041	0.040	0.040
Fear of failure	−0.035	−0.017	−0.016	−0.019	−0.018
<i>Country-level controls</i>					
GDP per capita	0.298**	0.240*	0.014	−0.030	0.014
GDP growth	−0.007	−0.011	0.034	−0.024	0.022
Trade freedom	0.325**	0.314**	0.221**	0.240**	0.220**
Trade (% of GDP)	0.321**	0.320**	0.284**	0.294**	0.298**
<i>Independent variable</i>					
Digitalization		0.637**	0.823**	0.807**	0.643**
<i>Moderators</i>					
Institutional voids			−0.554**		−0.744**
Internet usage (% of population)				0.550**	0.062
<i>Interaction effects</i>					
Digitalization × institutional voids			0.292**		0.501**
Digitalization × internet usage (% of population)				−0.265**	0.003
Institutional voids × internet usage (% of population)					0.285**
Digitalization × institutional voids × internet usage (% of population)					−0.240**
Country-level variance	0.980**	0.949**	0.876**	0.947**	0.842**
Slope (digitalization)			0.069	0.131	0.022
Akaike information criterion	9049.2	8986.8	8965.9	8972.5	8965.2
VIF	1.36	1.37	1.54	1.64	2.89
Log likelihood	−4504.6	−4472.4	−4458.0	−4461.2	−4453.6
Chi squared	98.5	164.0	166.2	143.8	192.9

Notes: Dependent variable is new venture internationalization. Observations: 6165 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

finding customers, partners, and suppliers using digital tools can require a significant investment of time and resources, especially if entrepreneurs lack the necessary digital skills and training (Eller et al., 2020). Verbeke and Hutzschenreuter (2020) also pointed out the challenges and neglected costs firms face when building digital assets for internationalization.

In Hypothesis 2, we posited that the positive relationship between digitalization and new venture internationalization would be stronger in the countries with more institutional voids. We also find evidence that entrepreneurs who use the internet to sell their products and services are relatively more engaged in foreign markets, compared to entrepreneurs who do not use the internet, when their home country has low-quality institutions—that is, high corruption, low regulatory quality and the weak rule of law, or low quality of public services, among others. Our findings show that entrepreneurs who use a digital strategy to reach customers can reduce better than non-digital entrepreneurs their dependence on the domestic economy through internationalization and overcome institutional difficulties in their home countries. Our study complements the Cuervo-Cazurra et al. (2019) and Oliver (1991) studies that suggested that there are several response options available in a weak institutional environment. The results of this study indicate that entrepreneurs use a combination of these options; use of the digital strategy allows entrepreneurs to use their home country institutional environment as an advantage since they are familiar with the home country institutions, they do not have to incur the cost associated with learning about the new institutional environment. At the same time, they can increase their market share or profit-seeking motivation by internationalizing. Our research also enriches the debate on the positive role of favorable contextual conditions for the internationalization of ventures. Kiss and Danis (2008), Chen et al. (2018), and Jean et al. (2020) discuss the positive effects of formal institutional quality for venture internationalization. For instance, Chen et al. (2018, p. 443) state that “better-

Table 6

Robustness check results 3: with single institutional voids measures.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
<i>Individual-level controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Country-level controls</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Moderators</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Independent variable</i>										
Digitalization	0.807 ^{****}	0.802 ^{***}	0.849 ^{***}	0.818 ^{***}	0.832 ^{***}	0.744 ^{***}	0.845 ^{***}	0.777 ^{***}	0.820 ^{***}	0.782 ^{***}
<i>Interaction effects</i>										
Digitalization										
× Control of corruption	0.264 ^{***}									
× Rule of law		0.261 ^{***}								
× Government effectiveness			0.320 ^{***}							
× Political stability				0.280 ^{***}						
× Regulatory quality					0.324 ^{***}					
× Voice and accountability						0.214 ^{**}				
× Security apparatus							0.330 ^{***}			
× State legitimacy								0.222 ^{***}		
× Public services									0.268 ^{***}	
× Human rights										0.233 ^{***}
Country-level variance	0.973 ^{***}	0.914 ^{***}	0.883 ^{***}	0.904 ^{***}	0.850 ^{***}	0.935 ^{***}	0.840 ^{***}	0.988 ^{***}	0.965 ^{***}	0.940 ^{***}
Slope (digitalization)	0.097	0.091	0.051	0.099	0.050	0.131	0.062	0.123	0.121	0.114
Akaike information criterion	8972.4	8968.2	8965.4	8967.3	8963.2	8972.8	8963.3	8975.2	8971.9	8971.8
VIF	1.57	1.54	1.60	1.54	1.50	1.44	1.54	1.50	1.65	1.50
Log likelihood	−4461.2	−4459.1	−4457.7	−4458.7	−4456.6	−4461.4	−4456.6	−4462.6	−4460.9	−4460.9
Chi squared	149.1	156.7	171.5	155.0	175.8	142.7	173.1	140.0	145.6	146.8

Notes: Dependent variable is new venture internationalization. Observations: 6165 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Moderating variables are coded so that higher values indicate a higher level of institutional voids. Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

developed home country formal institutions [...] have a supportive impact on the 'venture's likelihood of internationalization based on a data set covering 7668 individual ventures across 25 countries." Our country-level evidence (see Fig. 2) confirms this. However, we also present a new, more nuanced picture of the role of formal institutions in the internationalization of new firms, thereby addressing the question, "if institutional voids influence new ventures to do business outside the borders of their home country, under what condition does this happen?" (Adomako et al., 2019, p. 2). Our answer is that institutional voids positively moderate the positive relationship between digitalization and internationalization, such that digital new ventures are more positively influenced in their international endeavors than their non-digital counterparts. Thus, digital new ventures are less negatively affected by institutional voids than non-digital new ventures. We suggested that a lack of institutional quality can even contribute to internationalization indirectly by motivating digital entrepreneurs to find customers in foreign countries.

In Hypothesis 3, we presented that weak digital infrastructure lessens the positive relationship between digitalization and new venture internationalization. We argued that digital platforms and e-commerce-affine customers in the home country reduce a digital venture's dependency on foreign markets. We find support for our theorizing. Our findings indicate that a strong digital infrastructure in the home economy can reduce the willingness of digital entrepreneurs to internationalize. This somewhat contradicts previous research that uniformly highlighted the positive role of an excellent digital infrastructure for the internationalization of ventures, as they give "immediate, inexpensive and reliable access to customers, business partners and other supply chain partners around the globe" (Zahra, 2021, p. 3). In line with this research, we can also show that digital infrastructure is generally positively associated with new venture internationalization. Countries with a more advanced digital infrastructure tend to have a higher number of international new ventures (see Fig. 2). However, we add to the literature by showing that a strong digital infrastructure is beneficial for the internationalization of non-digital ventures, while it seems to motivate digital ventures to seize opportunities in their home country, where customers, partners, suppliers and other stakeholders are already digital. Conversely, the lack of digital infrastructure can also promote the internationalization of new businesses, as it motivates digital entrepreneurs to seek and exploit opportunities abroad that they cannot find in their home country due to weak digital infrastructure. Overall, the results of our study demonstrate the importance of institutional and infrastructure resources in the context of the internationalization of new ventures (Autio, 2017). Entrepreneurship literature has long argued the importance of resources (Barney, 1991). Entrepreneurs engage in asset-seeking and asset-augmenting strategies to match their objectives. Well-established digital infrastructures make home markets more attractive for digital entrepreneurs. Conversely, digital entrepreneurs should feel a greater need to seek customers abroad if they live in countries with slow internet, lack digital platforms, and lack e-commerce opportunities. The weaker relationship between an entrepreneur's digital

Table 7
Robustness check results 4: institutions or wealth?

	Model 1
<i>Individual-level controls</i>	
Gender (female)	−0.197***
Age	−0.002
Education (ref is none)	
Some secondary	0.176
Secondary degree	0.091
Post-secondary	0.259*
Graduate experience	0.494***
Household income (ref is low)	
Middle	0.198**
High	0.258***
Start-up skills	0.041
Fear of failure	−0.016
<i>Country-level controls</i>	
GDP growth	0.032
Trade (% of GDP)	0.222**
<i>Independent variable</i>	
Digitalization	0.828***
<i>Moderators</i>	
Institutional voids	−0.530***
GDP per capita	0.051
<i>Interaction effects</i>	
Digitalization × institutional voids	0.264***
Digitalization × GDP per capita	−0.048
Country-level variance	0.871***
Slope (digitalization)	0.066
Akaike information criterion	8967.6
VIF	1.85
Log likelihood	−4457.8
Chi squared	167.7

Notes: Dependent variable is new venture internationalization. Observations: 6165 (countries: 62). Sample Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

strategy and internationalization may also result from the fact that an entrepreneur does not depend on the internet to reach foreign customers in countries with good digital infrastructure. In a home country with an advanced digital infrastructure, digital companies working as intermediaries would take over this role and reduce the need for entrepreneurs to sell their products and services directly over the internet.

Finally, our study contributes to the discussion about the boundary condition of the country's characteristics. Prior internationalization literature suggested that entrepreneurs' responses to the home country environment vary, and digitalization has been used as a response medium (Chowdhury and Audretsch, 2021; Cuervo-Cazurra et al., 2019; Eduardsen, 2018; Oliver, 1991). In Hypotheses 4, we examined how the internationalization of new ventures is influenced by good digital infrastructure and a strong institutional void. Our study's findings also reveal an interesting interaction effect of a home country's institutional voids and digital infrastructure on the association of digitalization and new ventures' internationalization. The result of this study complements Eduardsen's (2018) study that suggested that the perception of the export barrier influences the impact of e-commerce on internationalization. Our results demonstrate that a digital infrastructure does buffer the strengthening effect of institutional voids on the digitalization-internationalization linkage because digital entrepreneurs may feel less the need to internationalize, despite the presence of low-quality institutions, when they benefit from a good digital infrastructure in their home countries.

The results are robust for several different specifications. Both the direct effect of digitalization on new venture internationalization as well as the moderating roles of institutional voids and digital infrastructure could be replicated with different samples as well as measures.

Table 8

Robustness check results 5: nascent entrepreneurship sample.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.291***	−0.278***	−0.270***	−0.270***	−0.270***
Age	−0.003	−0.002	−0.002	−0.002	−0.002
Education (ref is none)					
Some secondary	0.270**	0.207*	0.202*	0.197*	0.203*
Secondary degree	0.270***	0.145	0.124	0.116	0.125
Post-secondary	0.460***	0.288***	0.256**	0.246**	0.257**
Graduate experience	0.649***	0.469***	0.440***	0.433***	0.442***
Household income (ref is low)					
Middle	0.130**	0.112*	0.110*	0.111*	0.109*
High	0.111*	0.081	0.076	0.077	0.077
Start-up skills	−0.026	−0.032	−0.034	−0.034	−0.034
Fear of failure	−0.048	−0.056	−0.054	−0.055	−0.053
<i>Country-level controls</i>					
GDP per capita	0.493***	0.423***	0.027	0.091	0.091
GDP growth	0.064	0.077	0.139	0.083	0.152
Trade (% of GDP)	0.316***	0.302***	0.202**	0.246***	0.214***
<i>Independent variable</i>					
Digitalization		0.561***	0.573***	0.556***	0.619***
<i>Moderators</i>					
Institutional voids			−0.678***		−0.763***
Digital infrastructure				0.549***	−0.088
<i>Interaction effects</i>					
Digitalization × institutional voids			0.198***		0.081
Digitalization × digital infrastructure				−0.203***	−0.123
Institutional voids × digital infrastructure					0.050
Digitalization × institutional voids × digital infrastructure					0.049
Country-level variance	0.810***	0.728***	0.610***	0.687***	0.593***
Slope (digitalization)			0.097	0.108	0.090
Akaike information criterion	20,569.6	20,465.9	20,437.6	20,442.0	20,443.7
VIF	1.52	1.48	1.66	1.69	3.06
Log likelihood	−10,264.8	−10,212.0	−10,193.8	−10,196.0	−10,192.8
Chi squared	133.8	240.1	206.7	187.0	213.1

Notes: Dependent variable is new venture internationalization. Observations: 8902 (countries: 62). Sample: Actively involved in start-up effort, owner, no wages yet (variable: suboanw). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

6.2. Implications for management and public policy

Our findings illustrate the positive aspects of digitalization. Digitalization makes entrepreneurs so flexible that they can serve customers at home and abroad. The use of the internet and digital platforms enable new ventures to break local and national institutional boundaries and to operate in new markets and niches (Bharadwaj et al., 2013). We show that entrepreneurs who choose a digital strategy for their ventures advocate internationalized activities more likely. At the same time, a country with a digital infrastructure sets the incentive for digital entrepreneurs to focus on home country customers. Digital infrastructure can even motivate digital entrepreneurs to focus on the home market, although institutional voids complicate business activities. At the same time, we also find, as the strong positive bivariate relationship between digital infrastructure and new venture internationalization shows, that politicians can strengthen the export orientation of new and established ventures by focusing on a better digital infrastructure. Policymakers may take these findings into account and concentrate on advancing the digital infrastructure in their countries. For instance, policymakers could provide financial support, support education and training programs to improve digital literacy, and improve regulations allowing a digital infrastructure to emerge.

Besides, our results also show that policymakers should focus on improving institutions to increase entrepreneurial activity aiming at customer demand and satisfaction in the home country. Generally, we can assume that high-quality institutions stimulate both national and international entrepreneurial activity, which is also illustrated by the strong negative bivariate relationship between institutional voids and new venture internationalization. The likelihood that an entrepreneur only focuses on customers abroad is higher if institutions do not work well. By internationalizing, entrepreneurs can avoid paying bribes or unofficial payments, for instance.

Table 9

Robustness check results 6: established entrepreneurship sample.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.135***	−0.110**	−0.110**	−0.110**	−0.110**
Age	−0.001	0.001	0.001	0.001	0.001
Education (ref is none)					
Some secondary	0.137	0.128	0.114	0.114	0.115
Secondary degree	0.396***	0.326***	0.298***	0.298***	0.299***
Post-secondary	0.493***	0.373***	0.337***	0.338***	0.338***
Graduate experience	0.727***	0.564***	0.540***	0.541***	0.541***
Household income (ref is low)					
Middle	0.109*	0.087	0.086	0.086	0.087
High	0.433***	0.358***	0.353***	0.354***	0.354***
Start-up skills	0.210***	0.177***	0.173***	0.174***	0.173***
Fear of failure	−0.018	−0.003	−0.002	−0.003	−0.002
<i>Country-level controls</i>					
GDP per capita	0.325***	0.284***	0.089	0.097	0.124
GDP growth	0.071	0.072	0.115	0.085	0.122
Trade (% of GDP)	0.301***	0.291***	0.220**	0.235***	0.232***
<i>Independent variable</i>					
Digitalization		0.599***	0.693***	0.693***	0.685***
<i>Moderators</i>					
Institutional voids			−0.450***		−0.631**
Digital infrastructure				0.395**	−0.180
<i>Interaction effects</i>					
Digitalization × institutional voids			0.151***		0.190
Digitalization × digital infrastructure				−0.147**	0.060
Institutional voids × digital infrastructure					0.139
Digitalization × institutional voids × digital infrastructure					0.002
Country-level variance	0.846***	0.793***	0.767***	0.824***	0.740***
Slope (digitalization)			0.021	0.034	0.021
Akaike information criterion	21,060.9	20,916.1	20,903.7	20,908.3	20,910.2
VIF	1.40	1.41	1.63	1.65	3.24
Log likelihood	−10,510.5	−10,437.0	−10,426.9	−10,429.2	−10,426.1
Chi squared	244.3	393.4	353.1	335.1	353.2

Notes: Dependent variable is new venture internationalization. Observations: 12,534 (countries: 62). Sample: Managing or managing-owner of an established firm that is more than 3.5 years old (variables: estbbusm and estbbuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

Finally, our finding on the moderating roles of digital infrastructure may need to be interpreted with the finding on the level of institutional voids and its effect on internationalization. Our study suggests that the higher the levels of institutional voids, the more is the motivation for entrepreneurs to go international. To internationalize, entrepreneurs need to make efforts to access international market knowledge and networks. Digitalization is one of the means that firms can use to access such knowledge to internationalize. Digitization can facilitate access to domestic market information and to domestic networks, thereby overcoming some of the challenges that institutional voids may cause at home. Therefore, our study findings suggest that both the initiatives of improving digital infrastructure at home and reducing the levels of institutional voids at home are important for entrepreneurial growth both domestically and internationally. Growth in both international markets and domestic markets of entrepreneurship are complementary to the overall growth of any economy. Therefore, while the lack of institutional voids in the home market and good digital infrastructure in the home market are ideal conditions for entrepreneurial growth both domestically and internationally, good digital infrastructure in the home market with high levels of institutional voids could partly offset the challenges of addressing the home markets while parallelly internationalizing. Policymakers may therefore need to develop good formal institutions and a well-developed and functioning digital infrastructure at home to help entrepreneurs grow domestically and facilitate their internationalization.

6.3. Limitations and future research

Although this study provides valuable insight and findings for the field of international entrepreneurship, there are several limitations. First, the main challenge comes with the measures used in this study. Our digitalization measure is based on a single item that only captures one dimension of digitalization. Also, our measure of internationalization only captures internationalized sales, while

Table 10

Robustness check results 7: weak new venture internationalization.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.197***	−0.182**	−0.177**	−0.179**	−0.178**
Age	−0.003	−0.001	−0.002	−0.001	−0.002
Education (ref is none)					
Some secondary	0.253*	0.255*	0.229	0.217	0.223
Secondary degree	0.235*	0.147	0.093	0.084	0.091
Post-secondary	0.531***	0.348**	0.284*	0.276*	0.281*
Graduate experience	0.850***	0.655***	0.603***	0.598***	0.594***
Household income (ref is low)					
Middle	0.269***	0.238**	0.241**	0.243**	0.255**
High	0.370***	0.319***	0.315***	0.317***	0.334***
Start-up skills	0.078	0.043	0.033	0.035	0.036
Fear of failure	−0.022	−0.013	−0.008	−0.013	−0.009
<i>Country-level controls</i>					
GDP per capita	0.270*	0.212	−0.061	−0.007	0.042
GDP growth	−0.049	−0.050	0.007	−0.051	0.034
Trade (% of GDP)	0.409***	0.399***	0.286**	0.323**	0.292**
<i>Independent variable</i>					
Digitalization		0.678***	0.822***	0.821***	0.666***
<i>Moderators</i>					
Institutional voids			−0.638***		−1.072***
Digital infrastructure				0.546**	−0.375
<i>Interaction effects</i>					
Digitalization × institutional voids			0.288***		0.413**
Digitalization × digital infrastructure				−0.322***	−0.055
Institutional voids × digital infrastructure					0.294**
Digitalization × institutional voids × digital infrastructure					−0.222**
Constant	−1.299***	−1.434***	−1.498***	−1.443***	−1.235***
Country-level variance	1.397***	1.367***	1.160***	1.298***	1.115***
Slope (digitalization)			0.030	0.075	0.008
Akaike information criterion	5314.3	5255.6	5239.5	5245.5	5238.6
VIF	1.36	1.37	1.54	1.56	3.02
Log likelihood	−2642.2	−2611.8	−2599.8	−2602.7	−2595.3
Chi squared	91.02	151.3	164.2	143.2	181.8

Notes: Dependent variable is weak new venture internationalization (1% or more customers from outside the country). Observations: 6165 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

other dimensions of internationalization, such as geographical dispersion, international sourcing, foreign production, or speed of internationalization, have not been researched (Acedo and Jones, 2007; Buckley and Strange, 2015; Magnani et al., 2019). For instance, the use of the internet may positively influence the speed of internationalization. Also, geographical dispersion could have a positive impact on international new ventures' financial performance (Sadeghi et al., 2018) and innovation (Andries and Faems, 2013; Hitt et al., 1997; Presutti et al., 2019; Ramos-Hidalgo et al., 2022). Future research should therefore give priority to other or broader measures of digitalization and internationalization in an entrepreneurship context.

Second, given that there is only this one GEM wave (2014) that asks entrepreneurs if they use the internet to sell their products and services, the design of this study is cross-sectional, which does not allow for assertions to be made about causality or its direction. Consequently, the relationship between our two key variables—digitalization and internationalization—could be reversed, setting those new ventures to become internationalized and thus use the internet to sell their products and services. Previous research highlighted the knowledge, innovativeness, and capabilities advantages of new venture internationalization, which may also imply that the use of the internet and e-commerce platforms results from a learning process through internationalization (Autio et al., 2000; Hessels and van Stel, 2011). Future research may therefore consider a longitudinal design to consider bidirectional relationships and changes over time.

Third, further research could focus on alternative moderating variables. For instance, future research could also consider individual-level characteristics—such as age, income, education, international expertise, self-efficacy, social capital—as moderating variables. The focus of this study on formal institutions and digital infrastructure does not allow for testing other potential contextual

Table 11

Robustness check results 8: strong new venture internationalization.

	Model 1	Model 2	Model 3	Model 4	Model 5
<i>Individual-level controls</i>					
Gender (female)	−0.363***	−0.344***	−0.346***	−0.345***	−0.346***
Age	−0.005	−0.004	−0.005	−0.005	−0.005
Education (ref is none)					
Some secondary	0.001	−0.000	−0.096	−0.099	−0.094
Secondary degree	0.327	0.228	0.126	0.128	0.139
Post-secondary	0.401	0.229	0.109	0.112	0.118
Graduate experience	0.746**	0.545*	0.425	0.437	0.436
Household income (ref is low)					
Middle	0.168	0.141	0.126	0.131	0.138
High	0.263	0.202	0.183	0.186	0.209
Start-up skills	−0.024	−0.051	−0.060	−0.055	−0.056
Fear of failure	−0.046	−0.041	−0.037	−0.048	−0.030
<i>Country-level controls</i>					
GDP per capita	0.274**	0.223**	0.080	0.146	0.182
GDP growth	−0.061	−0.062	−0.047	−0.073	−0.005
Trade (% of GDP)	0.301***	0.286***	0.236***	0.271***	0.262***
<i>Independent variable</i>					
Digitalization		0.622***	0.907***	0.911***	0.832***
<i>Moderators</i>					
Institutional voids			−0.441***		−0.857***
Digital infrastructure				0.309*	−0.436
<i>Interaction effects</i>					
Digitalization × institutional voids			0.292**		0.243
Digitalization × digital infrastructure				−0.340**	−0.233
Institutional voids × digital infrastructure					0.185
Digitalization × institutional voids × digital infrastructure					−0.145
Country-level variance	0.580***	0.522***	0.620***	0.662***	0.552**
Slope (digitalization)			0.473	0.484*	0.461
Akaike information criterion	2435.4	2415.5	2406.1	2410.1	2408.6
VIF	1.36	1.37	1.54	1.56	3.02
Log likelihood	−1202.7	−1191.7	−1183.1	−1185.0	−1180.3
Chi squared	64.96	89.58	88.41	82.36	96.31

Notes: Dependent variable is strong new venture internationalization (more than 25% of customers from outside country). Observations: 6165 (countries: 62). Sample: Managing or managing-owner of a new firm that is less than 3.5 years old (variables: babybusm and babybuso). Country-level variables were z-standardized.

* $p < .1$.

** $p < .05$.

*** $p < .01$.

factors such as culture, history, or demographics (Brieger et al., 2021). The economic, cultural, institutional, and physical distance between countries can play a role in whether digital entrepreneurs are willing to internationalize with their ventures (López-Duarte and Vidal-Suárez, 2010). Besides, research on institutional voids suggests that voids can exist in both formal and informal institutions and that they are both capable of constraining entrepreneurial behavior (Webb et al., 2020). Research could therefore potentially consider informal institutions in theory building and future empirical studies. Moreover, we only concentrated on home country characteristics as moderators since the GEM database does not provide information about the foreign countries where entrepreneurs found customers. Future research could therefore also take into account foreign country characteristics.

Fourth, our research explores rather the positive aspect of digitalization for entrepreneurial outcomes. However, given that there is also a dark side of digitalization for individuals, organizations and societies, future research could further investigate the negative effects of digitalization in the context of (international) entrepreneurship. An interesting avenue for research could be the interrelations of digital international entrepreneurship, gender and job satisfaction, organizational learning, work-life balance, autonomy and financial well-being. Research has shown that women entrepreneurs have more difficulties balancing work and family responsibilities (De Clercq and Brieger, 2021). At the same time, women entrepreneurs tend to be less internationally oriented with their ventures, compared to their male counterparts, as also our results suggest. It would therefore be interesting to know to what extent digitization not only influences women entrepreneurs' strategies for exploiting opportunities in foreign markets, but also how this relates to their work-life balance and job satisfaction. To date, the role of well-being in international entrepreneurship has not been researched.

Declaration of competing interest

All co-authors declare that they have no conflict of interest.

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Appendix A

New Venture Internationalization

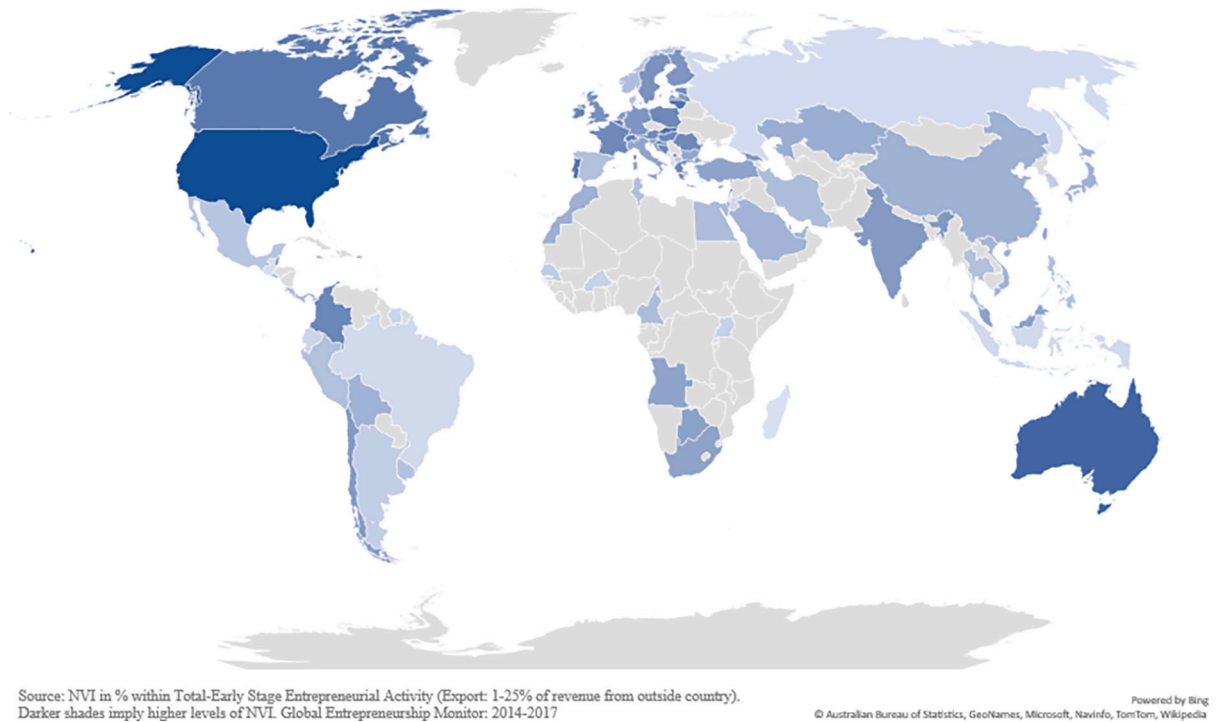


Fig. A1. New venture internationalization in %.

Table A1
Countries.

Angola	Cameroon	Finland	Italy	Peru	South Africa
Argentina	Canada	Georgia	Jamaica	Philippines	Spain
Australia	Chile	Germany	Japan	Poland	Sweden
Austria	China	Greece	Kazakhstan	Portugal	Switzerland
Barbados	Colombia	Guatemala	Lithuania	Qatar	Thailand
Belgium	Costa Rica	Hungary	Luxembourg	Romania	Uganda
Bolivia	Croatia	India	Mexico	Russia	United Kingdom
Bosnia and Herzegovina	Denmark	Indonesia	Netherlands	Singapore	United States
Botswana	Ecuador	Iran	Norway	Slovakia	Uruguay
Brazil	El Salvador	Ireland	Panama	Slovenia	Vietnam
Burkina Faso	Estonia				

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