International Business Review 32 (2023) 102135

Contents lists available at ScienceDirect

International Business Review

journal homepage: www.elsevier.com/locate/ibusrev

Digitalization, internationalization, and firm performance: A resource-orchestration perspective on new OLI advantages

Krishna Raj Bhandari [a,*,1], Peter Zámborský [b,2], Mikko Ranta [c,3], Jari Salo [d,4]

[a] University of Helsinki, Finland, P.O. BOX 27, Latokartanonkaari 5, FI-00014 Helsinki, Finland
[b] Management and International Business, The University of Auckland Business School, Owen G Glenn Building - Bldg 260, Level 4, Room 486, 12 Grafton Rd, Auckland 1010, New Zealand
[c] University of Vaasa - School of Accounting and Finance, P.O. Box 700, FIN-65101 Vaasa, Finland
[d] University of Helsinki, Finland, P.O. BOX 27, Latokartanonkaari 5, FI-00014 Helsinki, Finland

ARTICLE INFO

Keywords:
Digitalization
Internationalization
Performance
Digital transformation
Digital resources
Resource orchestration
Resource-based view
New OLI advantages
FDI spillovers

ABSTRACT

Digital forces and digital global connection weaken traditional ownership, location and internalization (OLI) advantages and intensify new OLI advantages (open resources, linkages and integration). However, by building on the resource-orchestration theory, we raise the question of how digitalization (utilization and orchestration of digital resources) and internationalization (firm-level outward internationalization and country-level inward internationalization) affect firm performance. We introduce the degree of outward internationalization and home-country inward foreign direct investment (FDI) inflows as moderators in achieving firm performance as a result of digitalization. Using a panel dataset of 571 U.S. manufacturing firms, we find a curvilinear relationship between digitalization and performance. The top quartile of digitalization efforts is rewarded by significant profitability. Moreover, high levels of outward internationalization and high net-FDI inflows increase the performance gains attributable to high levels of digitalization. Overall, the resource-orchestration theory complements new OLI advantages in explaining firm performance in the digital world.

1. Introduction

Digitalization is a fundamental new reality in international business (IB; Ahi et al., 2021; Ghauri et al., 2021; Nambisan & Luo, 2022). It can transform IB strategy and improve firm performance (Luo, 2021; Mellahi et al., 2021). However, achieving profitability as a result of digitalization is challenging. According to McKinsey and Company (2019), distribution of gains from digitalization within industries is highly uneven. Despite digitization risks in IB (Luo, 2022a), there is substantial potential for firms with international operations to improve their performance as a result of digitalization (Luo, 2022b). The relationship between digitalization and firm performance has been recognized in business and management research as an important area of future research on digitalization (Hanelt et al., 2021). Verhoef et al. (2021) suggest that we need to better understand how internal-firm (e.g., firm-level degree of outward internationalization [DOI]) and external-market factors (e.g., presence of foreign multinational enterprises [MNEs] in a firm's home country) moderate the impact of digitalization on firm performance.

IB research still needs to further explain how digitalization and internationalization affect firm performance (Deng, Liesch, et al., 2021; Martínez-Caro et al., 2020). For example, Verbeke and Hutzschenreuter (2021) theorize both bright and dark sides of digital globalization, but do not focus on their implications for firm performance. Luo (2021) argues that digital forces and digital global connection weaken traditional ownership, location and internalization (OLI) advantages (Dunning, 1981), and intensify new OLI (open-resources, linkages, and integration) advantages. However, we still need to better understand

Abbreviations: OLI, Ownership, Location and Internalisation; FDI, Foreign Direct Investment; CATA, Computer-aided Text Analysis.

* Corresponding author.
E-mail addresses: krishna.bhandari@helsinki.fi, krishna.suomi@gmail.com (K.R. Bhandari).
[1] https://orcid.org/0000-0003-4064-1905
[2] http://orcid.org/0000-0002-4388-3187
[3] https://orcid.org/0000-0002-9096-1635
[4] https://orcid.org/0000-0002-4661-2307

https://doi.org/10.1016/j.ibusrev.2023.102135
Received 22 December 2021; Received in revised form 15 February 2023; Accepted 10 March 2023
Available online 23 March 2023
0969-5931/© 2023 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

how the new OLI advantages underpin the impact of digitalization and internationalization on firm performance at different levels of digitalization and internationalization, as many firms are not ready to benefit from digitalization (Björkdahl, 2020; Srinivasan, 2021). Moreover, in explaining the digitalization–performance relationship, research has not sufficiently considered the roles of outward and inward (home-country) aspects of internationalization (Deng, Liesch, et al., 2021; Luo & Witt, 2022). Hence, the aim of this paper is to answer an important question: *How do firm-level degree of outward internationalization and home-country foreign direct investment (FDI) inflows influence the relationship between digitalization and firm performance?*

Digital resources (e.g., digital assets, digital agility, digital-networking capability and big data-analytics capability) and advantages related to firm-level outward internationalization (e.g., traditional and new OLI advantages) can improve firm performance. However, IB literature emphasizes the link between internationalization and performance (Lu & Beamish, 2004; Schwens et al., 2018) or between digitalization and internationalization (Autio et al., 2021; Verbeke & Hutzschenreuter, 2021), while not adequately exploring the moderating effects of internationalization on the digitalization–performance relationship. For example, digitalization is linked with firms' internationalization activities in terms of location choice, governance structure and international penetration (Autio et al., 2021; Banalieva & Dhanaraj, 2019; Shaheer & Li, 2020). However, research does not sufficiently distinguish between digitalization and internationalization and does not focus on their impact on firm performance. Studying the impact of digitalization and internationalization on firm performance matters because the strategic timing and calibration of investments in digital resources and internationalization are instrumental to achieving competitiveness (Deng, Zhu, et al., 2021; Shaheer & Li, 2020).

It is also important to consider external-market factors as moderators of the digitalization–firm-performance relationship (Verhoef et al., 2021). Notably understudied is the extent to which the presence of foreign MNEs in the home market, and knowledge spillovers from them (Javorcik, 2004; Orlic et al., 2018), influences how firms take advantage of digitalization to improve their performance (Atasoy, 2021; Proeger & Runst, 2020). Verbeke and Hutzschenreuter (2021) caution that location-bound factors still matter in the digital world. However, we do not fully understand how FDI inflows in the home country, and spillovers from them, relate to location-bound advantages and affect the digitalization–performance relationship (Jankowska et al., 2021).

It is important to consider FDI in the home country because digital global connection intensifies linkage advantages (e.g., better-connected and orchestrated interfirm linkages and better linkages with customers) and suggests growing externalization gains that weaken traditional internalization advantages (Luo, 2021). Hence, building on research on outward and inward (home-country) aspects of internationalization (H. Li et al., 2017; J. Li et al., 2012; Luo & Witt, 2022), we define internationalization as a multilevel construct (Hillemann & Gestrin, 2016) including firm-level outward internationalization (e.g., via the firm's foreign sales) and country-level inward internationalization (e.g., via FDI by foreign firms in the home country).

We ground our study in Sirmon et al.'s (2011) resource-orchestration theory, and in advancements in theorizing digitalization in IB, notably Luo's (2021) framework of new OLI advantages. These two bodies of work provide a theoretical grounding for explaining IB factors moderating the digitalization–performance relationship. Resource-orchestration theory integrates resource management (structuring, bundling and leveraging resources) with asset orchestration (search/selection and configuration/deployment of resources) perspectives. It provides an opportunity to extend the new OLI advantages toward explanations of firm performance grounded in the resource-based view (RBV; Barney, 1991; Sirmon et al., 2007).

The digital-transformation literature and the RBV's stream on digital resources can help us to establish a link between digitalization and firm performance (Aral & Weill, 2007; Dąbrowska et al., 2022). Luo's (2021) framework of new OLI advantages is useful in explaining the moderating roles of firm-level outward internationalization (Abdi & Aulakh, 2018; Rosa et al., 2020) and home-country FDI inflows (Jankowska et al., 2021; Proeger & Runst, 2020). We hypothesize that the digitalization–performance relationship is J-shaped. Only high-level digitalization leads to high profitability. A firm's DOI moderates the digitalization–performance relationship in such a way that relatively high-level internationalization increases the performance gains attributable to high-level digitalization. FDI inflows into the home country moderate the digitalization–performance relationship in such a way that relatively high-level FDI inflows increase the performance gains attributable to high-level digitalization.

Our findings confirm our hypotheses, with high-level digitalization associated with high profitability, and high-level outward internationalization and high-level net-FDI inflows increasing the performance gains attributable to high-level digitalization. The study contributes to the literature on digitalization and firm performance by proposing moderated curvilinear effects as a result of the bright and dark sides of digitalization and digital globalization (Dąbrowska et al., 2022; Verbeke & Hutzschenreuter, 2021). This helps us to better understand the roles of outward and inward internationalization in the digitalization–performance relationship at different levels of digitalization and internationalization. We also contribute to IB research by integrating Luo's (2021) framework of new OLI advantages with a resource-orchestration perspective on digitalization.

To investigate the moderating effects of firm-level internationalization and home-country FDI on the digitalization–performance relationship, we analyze a sample of U.S. manufacturing firms in 1992–2019, employing a unique computer-aided text-analysis (CATA) measure of digitalization that uses text mining, machine learning (ML), natural language processing, and artificial intelligence. The paper proceeds with a theoretical background and hypotheses, followed by methodology, results, discussion and conclusions.

2. Theoretical background and hypotheses

We build on Luo's (2021) framework of new OLI advantages, which recognizes that digital forces (e.g., intangible flows of knowledge and data and quickened access and diffusion of knowledge) shape digital global connection. This weakens traditional OLI and intensifies new OLI advantages. The open-resources advantage implies that digital forces and increased digital global connection make more global resources available and benefit MNEs utilizing these resources (Luo, 2021). However, it is also important for firms to convert and structure global resources into firm-specific advantages (FSAs; Verbeke & Hutzschenreuter, 2021). This can be achieved via utilizing *firm-specific digital resources* and leveraging digital resources for competitive advantage, thus improving performance.

The linkage advantage implies that MNEs benefit from better-connected interfirm linkages, better-orchestrated intra-firm linkages, and better linkages with global customers due to better digital global connection (Luo, 2021). Moreover, firm-level digitalization, fueled by accessing *digital-network resources* (Gulati, 1999), helps firms to convert improved resource search/selection and configuration into firm performance. Network resources are resources embedded in firms' networks (Lavie, 2006; Smith & Smith, 2021). They require orchestration capability to be accessed, developed and taken advantage of (Perks et al., 2017). The integration advantage implies that higher connectivity (due to digital forces and digital global connection) fosters efficiency. Moreover, digital technologies help to better synchronize global activities (Luo, 2021) and development of *digital-synchronization capabilities* helps firms to deploy resources for efficiency and innovation. This can result in better performance (Carnes et al., 2021). Synchronization is the integration and coordination of actions to manage the firm's resources to support and implement a leveraging strategy (Carnes et al., 2021). Digital-synchronization capabilities also involve the bundling element

Table 1
A resource-orchestration perspective on digitalization and new OLI advantages.

Dimension of digitalization (digital resources)	Digitalization phase of resource utilization	Related elements from Sirmon et al. (2011)	Digitalization phase of resource orchestration	Related elements from Sirmon et al. (2011)	Related elements from Luo (2021)
Firm-specific digital resources	Converting global resources into FSAs	Structuring resources	Leveraging digital resources	Leveraging resources	Open-resource advantage
Digital-network resources	Accessing digital-network resources	Resource search and selection	Coordinating digital resources	Configuring resources	Linkage advantage
Digital-synchronization capabilities	Developing digital-synchronization capabilities	Bundling resources	Synchronizing digital resources	Deploying resources	Integration advantage

Source: authors and adapted from Sirmon et al. (2011) and Luo (2021).

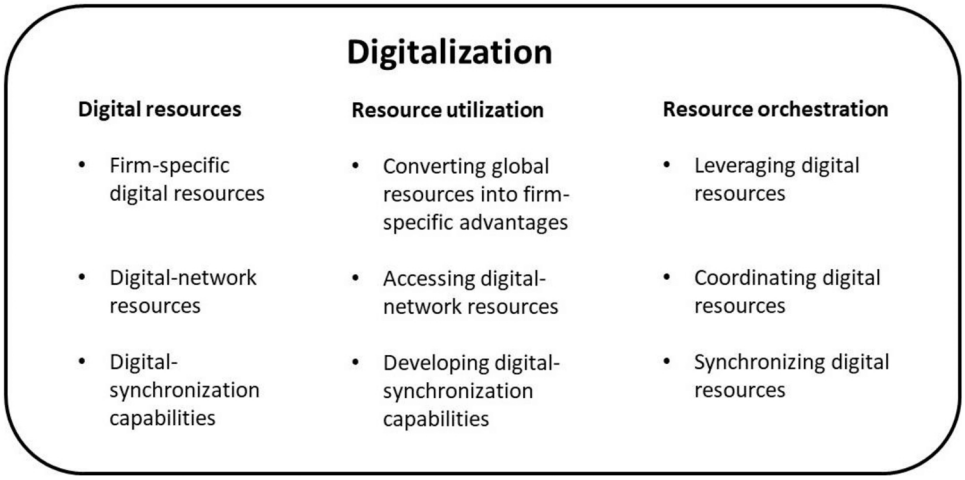

Fig. 1. Digitalization: A resource-orchestration perspective.

of resource orchestration (Sirmon et al., 2011).

Table 1 summarizes how the three dimensions of digitalization (firm-specific digital resources, digital-network resources, and digital-synchronization capabilities) link to Sirmon et al. (2011) and Luo (2021). Our resource-orchestration perspective on digitalization and new OLI advantages stresses two phases of digitalization: resource utilization and orchestration. We also develop a conceptual framework (Fig. 1), which acknowledges the three dimensions of digitalization in terms of digital resources. Table 2 integrates Table 1 and Fig. 1 with Verhoef et al.'s (2021) conceptualization of digitalization.

Verhoef et al. (2021) suggest that "we need to gain a better understanding of the contextual influences and determine which internal-firm and external-market factors may moderate the impact of digital transformation on firm performance" (p. 896). We focus on one internal-firm (DOI) and one external-market factor (inward FDI in the home country) as moderators of the digitalization–performance relationship. Next, we develop hypotheses.

2.1. *Digitalization and firm performance*

The link between digitalization and firm performance intrigues scholars (Caputo et al., 2019; Ferreira et al., 2019; Tsou & Chen, 2021) and practitioners (McKinsey & Company, 2019). The RBV and capability theory acknowledge the positive link between IT assets, organizational capabilities, and firm performance (Aral & Weill, 2007). For example, Amit and Han (2017) explain value creation through resource allocations and novel resource configurations in a digital world. However, McKinsey & Company (2019) finds that the best-performing decile of digitized incumbents earned 80% of the digital revenues generated in their industries. Hence, reaping profits from digitalization is not guaranteed (Mithas & Rust, 2016). According to McKinsey & Company (2019), the average digitalization strategy implemented by firms stood an 11% chance of surpassing a firm's profit expectations.

The main reason for the ambiguous (and sometimes negative) link between digitalization and performance (e.g., Cappa et al., 2021; Usai et al., 2021) is that while there are "bright sides" of digitalization, i.e., benefits and opportunities that result in digitalization's positive impacts, there are also "dark sides" (Dąbrowska et al., 2022). These include the costs and threats that result in digitalization's negative impacts on organizations and their performance (e.g., Trittin-Ulbrich et al., 2021; Turel et al., 2021). Overall, the impact of bright and dark sides of digitalization (Table 3) on firm performance is insufficiently understood (Dąbrowska et al., 2022).

The bright sides of digitalization can positively affect performance via improved efficiency and growth (Björkdahl, 2020). In terms of operational efficiency, digital resources can lower transaction costs and costs of production (Mithas & Rust, 2016). This enables organizations to become internally more efficient, for example through better ways of working and organizing (Schildt, 2017; Trittin-Ulbrich et al., 2021). In terms of growth and innovation, research acknowledges links between digitalization and the innovative capabilities of firms, which can positively influence performance (Ferreira et al., 2019; Tsou & Chen, 2021). Studies also acknowledge links between digital resources (e.g., IT and big data) and soft-skill building as a bridge between human and technology dimensions for increasing performance (Caputo et al., 2019; Kristoffersen et al., 2021). Furthermore, Morgan-Thomas et al. (2020) point to the benefit of collecting and analyzing data to enhance consumer experiences and predict consumption and behavioral patterns. Digitalization also enables businesses to develop capabilities for market-shaping (Nenonen et al., 2019; Zámborský, 2021), develop new markets and business models (Volberda et al., 2021), and achieve economies of scope (Adner et al., 2019).

The dark sides of digitalization (Trittin-Ulbrich et al., 2021) include individual-, organizational-, ecosystem- and socioeconomic-level factors

Table 2
Conceptualizations of digitalization.

Conceptualization in this study			
Definition of digitalization:	A firm's utilization and orchestration of digital resources		
Digital resources	Firm-specific digital resources	Digital-network resources	Digital-synchronization capabilities
Resource utilization	Converting global resources into firm-specific advantages (FSAs)	Accessing digital-network resources	Developing digital-synchronization capabilities
Resource orchestration	Leveraging FSAs for sustainable competitive advantage/ performance	Coordinating resources for improved firm performance	Synchronizing resources for improved firm performance
Conceptualization by Verhoef et al. (2021)			
	Stages of digital transformation		
	Digitization	Digitalization	Digital transformation
Typical digital resources involved	Digital assets	Digital assets, digital agility, digital-networking capability	Digital assets, digital agility, digital-networking capability, big data analytics capability
Examples of digital resources from Verhoef et al. (2021)	Automated routines and tasks; conversion of analog into digital information	Use of robots in production; addition of digital components to product or service offering; digital distribution and communication channels	Introduction of new business models like "product-as-a-service"; digital platforms, and pure data-driven business models
Links between our conceptualization, Verhoef et al. (2021) and Luo (2021)			
Links between our conceptualization and Verhoef et al. (2021)	Digital assets are one element of digital resources; Firm-specific digital resources include digital assets and agility	Digital-network resources are pre-requisite for digital-networking capability	Digital-synchronization capabilities include digital-networking capability and big data analytics capability
Links between our conceptualization and Luo (2021)	Firm-specific digital resources are linked to how firms utilize global resources (Luo's "open-resources advantage")	Digital-network resources are related to interfirm, intra-firm, and firm-customer linkages (Luo's "linkage advantage")	Digital-synchronization capabilities link to how digital technologies help synchronize activities (Luo's "integration advantage")

Source: authors and parts adapted from Luo (2021) and Verhoef et al. (2021).

(Turel et al., 2021), notably those linked to complexity and coordination costs of digitalization (Dąbrowska et al., 2022; Hanelt et al., 2021). Complexity costs of digitalization relate to the difficulties in managing and implementing multiple digital technologies and disruptions related to the reshaped nature of work (Brynjolfsson & Mitchell, 2017; J. Cho et al., 2022). Firms may not be able to realize complex interrelationships among digital technologies (Mithas & Rust, 2016). There is also the dark side of top-management support for complex digital transformation (Cortellazzo et al., 2019; Elbanna & Newman, 2022). Lastly, there are costs related to the complexity of digital innovation (Dougherty & Dunne, 2012; Holmström, 2018). Coordination costs can also increase as a result of digitalization, for example in relation to cross-functional

Table 3
Bright and dark sides of digitalization and digital globalization.

Bright sides of digitalization	Dark sides of digitalization	Dark sides—study examples
Efficiency benefits	*Individual level*	*Complexity costs*
• lower transaction costs as well as costs of production • can enable organizations to become internally more efficient • enable firms to create efficient ways of working and organizing	• technology addiction, problematic use of IT, technostress, general stress, experience of ambivalence, negative health outcomes, security & privacy concerns, online deviant behaviors (e.g., cyberbullying), dark side of user-generated content	• difficulties in managing and implementing multiple digital technologies, disruptions due to the nature of work being reshaped by digitalization (Brynjolfsson & Mitchell, 2017) • the dark side of top-management support for digital transformation (Elbanna & Newman, 2022) • the complexity of digital innovation (Yoo et al., 2010)
Growth benefits	*Organizational level*	*Coordination costs*
• support capacity to develop new products and services, and to address and influence users, customers, clients, and the public • enable firms to shape markets, develop new markets and business models • help firms to expand the scope of their activities/ achieve economies of scope • assist in collecting, analyzing and leveraging data to enhance consumer experiences and to predict consumption and general behavioral patterns	• employees' constant connectivity to work, cyberloafing (pretending to work), technology-related interruptions, deviant workplace behaviors, diminished control over work	• the negative influence of digitalization on cross-functional co-ordination (Ruiz-Alba et al., 2020) • the negative influence of digital technologies on supply-chain coordination (Ran et al., 2020) • the negative influence of digitalization on the coordination of production process (Rüling & Duymedjian, 2014)
	Socioeconomic/ ecosystem	
	• job losses due to automation, high rates of product returns, dark sides of digital platforms	
Bright sides of digital globalization	Dark sides of digital globalization	
Digital-network governance allows creation and exploitation of ecosystem-specific advantages; digitally supported network rules align actors' incentives	*Governance* • digital-network governance must include localized asset ownership and local-context knowledge • need to internalize complementary, co-specialized resources	
Digital resources such as data flows, unconstrained by spatial and time-restrained boundaries, allow FDI-light footprints; digitally supported resource-orchestration substitutes for asset ownership in internationalization, reduces liabilities of foreignness	*Resources/assets* • requisite physical-asset footprints of born digitals, diversifying into brick-and-mortar assets • heavier international footprints of going digitals thanks to digital resources • requirement of substantial localized, complementary resources abroad	
Positive network externalities (within and across countries) drive emergent winner-takes-all digital hubs, penetrating brick-and-mortar sectors; easy adaptation of digital-hub internationalization strategies	*Customer value* • negative network externalities due to power concentration • digital nationalism prevents global digital-hub dominance • digital vulnerability and other customer-interface barriers to internationalization	

Sources: adapted from Dąbrowska et al. (2022); Verbeke and Hutzschenreuter (2021); Trittin-Ulbrich et al. (2021); Turel et al. (2021) and authors' research.

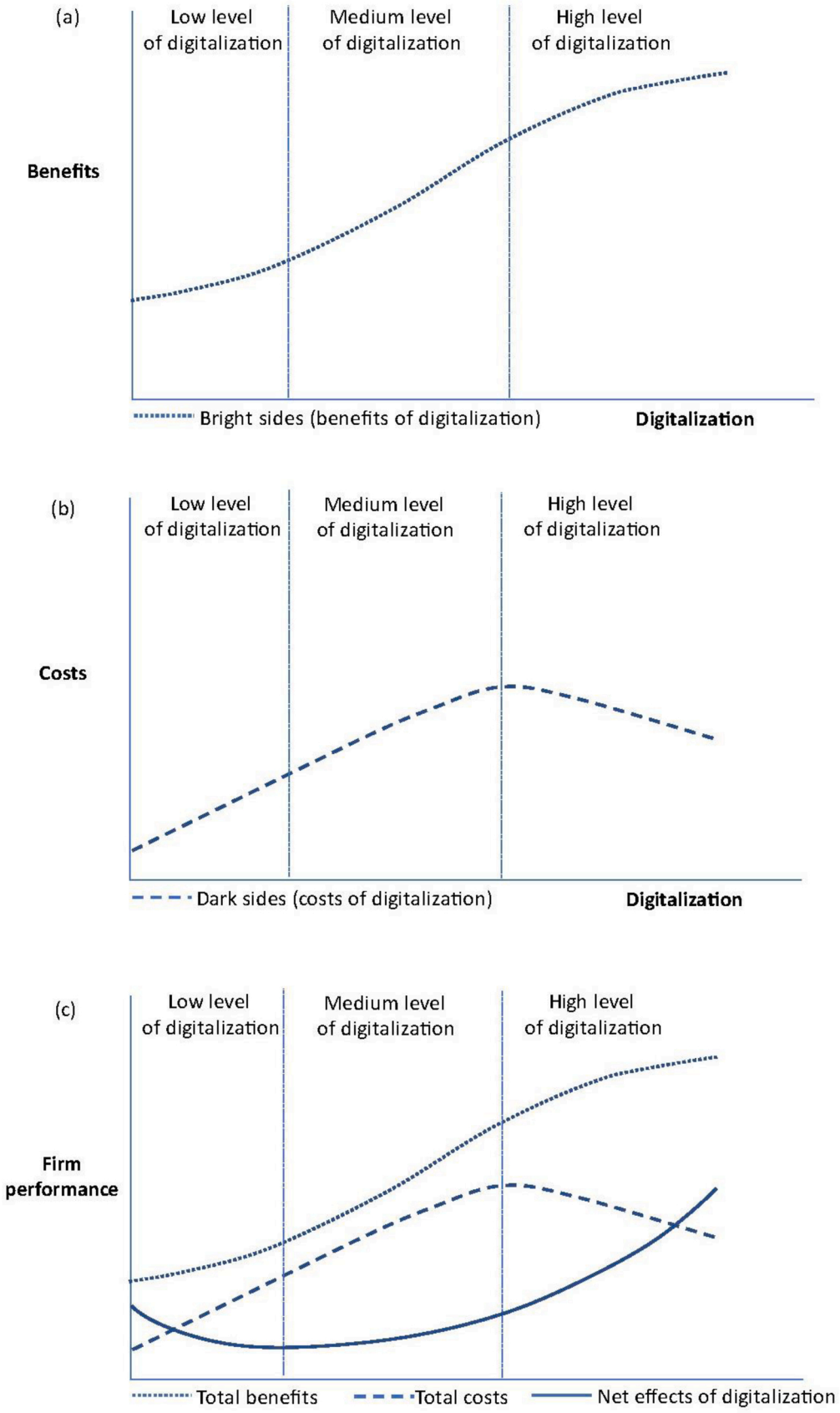

Fig. 2. The digitalization–performance relationship.

Table 4
Three stages of digitalization–performance relationship.

	Stage 1	Stage 2	Stage 3
Digitalization level	Low	Medium	High
Impact of digitalization on performance			
Digital resources	A few digital resources acquired and developed.	A moderate volume of digital resources developed.	A high volume of digital resources developed.
Resource utilization	Firms utilize effectively only some digital resources.	Complexity of managing multiple resources leads to moderate utilization.	Resource utilization mastered for multiple digital resources; complexity managed.
Resource orchestration	Not much resource orchestration is needed or done.	Some orchestration, but hampered by coordination issues.	Resource orchestration mastered, coordination capabilities developed.
Bright and dark sides of digitalization—comparative change	Dark sides increase more rapidly than bright sides.	Bright sides catch up and start to grow more rapidly than dark sides.	Bright sides increase at decreasing rate, dark sides subside.
Bright and dark sides—absolute change	Both bright and dark sides are growing.	Both bright and dark sides are growing.	Bright sides still grow, dark sides begin to fall.
Impact on firm performance	Negative or weak—initial gain in efficiency but few growth benefits, some complexity and coordination costs.	Weak or positive—some efficiency and growth benefits, increasing complexity and coordination costs.	Positive—high efficiency and growth benefits, high complexity but lower coordination costs.
Moderating role of (high) outward internationalization (internal-firm factor)			
New OLI advantages	Firms acquire and develop some new OLI advantages.	Firms develop and utilize several new OLI advantages.	Firms orchestrate several new OLI advantages (with some challenges).
Traditional OLI advantages	Firm still rely on the classic OLI advantages.	Firms start to reduce reliance on classic OLI.	Firms reduce their reliance on classic OLI.
Bright and dark sides of digital globalization	Bright and dark sides of digital globalization are both rather low.	Dark sides of digital globalization grow faster than bright sides.	Bright sides of digital globalization start to dominate dark sides.
Impact on firm performance	Weak digitalization–performance relationship.	Weak or negative digitalization–performance relationship.	Positive impact of high digitalization spurred by high internationalization.
Moderating role of (high) inward foreign direct investment (FDI) in home country (external-market factor)			
New OLI—open-resource advantage	Few resources from FDI available, weak absorptive capacity.	More FDI resources available, better capacity to utilize them.	Substantial resources from FDI, capacity to utilize them well.
Linkage advantage	Better-connected interfirm linkages start to facilitate FDI spillovers.	Better-orchestrated intra-firm linkages facilitate knowledge transfer and spillovers.	Better-orchestrated intra- and interfirm linkages stimulate knowledge spillovers.
Integration advantage	Weak connectivity, weak knowledge-transfer efficiency.	Better connectivity, modest knowledge-transfer efficiency.	Strong connectivity & knowledge transfer, good synchronization.
FDI spillovers	Low-FDI spillovers coupled with low absorptive capacity.	Moderate FDI spillovers and modest absorptive capacity.	Positive, significant FDI spillovers, high absorptive capacity.
Impact on firm performance	Negative or weak digitalization–performance relationship.	Weak or weakly positive digitalization–performance relationship.	Positive impact of high digitalization spurred by high home-country-FDI inflows.

coordination (Ruiz-Alba et al., 2020), supply chains (Bejlegaard et al., 2021; Ran et al., 2020), or production-process coordination (Rüling & Duymedjian, 2014). However, digitalization can also make coordination easier when digital-coordination capabilities are developed. Overall, the dark sides of digitalization can negatively impact firm performance (Addas & Pinsonneault, 2018; Cappa et al., 2021).

Given the bright and dark sides of digitalization, we can specify how the resulting benefits and costs vary across different levels of digitalization. Fig. 2 sums up the interplay of benefits and costs across different digitalization levels. Table 4 summarizes the logic behind our hypotheses, linking to both bright and dark sides of digitalization and to digital resources and their utilization and orchestration. At low-level digitalization, when firms effectively utilize only some digital resources, digitalization is likely to produce only modest initial efficiency gains, and even smaller growth benefits (Björkdahl, 2020; Kohtamäki et al., 2020; Zhai et al., 2022). With medium-level digitalization, firms utilize and orchestrate higher volumes of digital resources more effectively (Chen & Tian, 2022; J. Cho et al., 2022). This has a positive effect on efficiency (Agarwal et al., 2010) and sustained quality improvements (Bouwman et al., 2011), enhancing performance. With high-level digitalization, economies of scale strengthen the bright sides of digitalization, but diminishing returns eventually result in a decreased rate of impact at high levels (see Part A of Fig. 2).

Costs related to the acquisition, development and deployment of digital resources (partly sunk costs) are presented in Part B of Fig. 2. They initially (at low-level digitalization) rise rapidly as firms have insufficient supporting routines and knowledge base to efficiently utilize and orchestrate these resources (Chen & Tian, 2022; H. Wang, Xue, et al., 2020). The coordination and complexity costs are initially relatively low, due to limited digital resources, but they rise more rapidly than benefits, hurting performance (Cappa et al., 2021; Usai et al., 2021). Dark sides of digitalization continue increasing at medium-level digitalization, as it takes time to develop complementary capabilities to support digitalization (Kim et al., 2005; Kohtamäki et al., 2020). At high-level digitalization, total costs of digitalization may start decreasing, as companies improve their digital-coordination capabilities and learn to cope with detrimental effects of digitalization (L. Li, 2022). For example, investments in digital organizational culture, including management of cognitive conflicts, can positively affect digitalization's long-term impact on firm performance (Martínez-Caro et al., 2020; H. Wang, Feng, et al., 2020). However, complexity costs of digitalization (e.g., complex systems-integration projects and cognitive costs for knowledge recombination), may continue to be high in this stage, and reduce net effects of digitalization (Landauer, 1995; Lanzolla et al., 2021).

Taken together, as can be seen in Part C of Fig. 2, dark sides (complexity and coordination costs) are likely to increase more rapidly than the initial increase in the bright sides (mostly efficiency benefits at this stage) of digitalization. This will lead to a negative or weak relationship between digitalization and firm performance at low-level digitalization. At medium-level digitalization, the bright sides (e.g., efficiency and increasing growth benefits) of digitalization are likely to be higher and increase more rapidly than the dark sides (e.g., complexity and coordination costs). This will lead to an increasingly positive relationship between digitalization and performance. At high-level digitalization, the bright sides continue increasing (at a decreasing rate) while the dark sides start falling. This will result in mostly positive net effects

of digitalization on performance.

In summary, taking into consideration all levels of digitalization, we predict:

Hypothesis 1. (H1). The relationship between digitalization and firm performance is curvilinear, with the slope negative or weak at low-level digitalization, weak or positive at medium-level digitalization, and positive at high-level digitalization.

2.2. The interplay of firm-level outward internationalization and digitalization

Drawing on contingency thinking, Verbeke and Hutzschenreuter (2021) stress that the benefits (bright sides) of digital globalization (a higher digital intensity of the MNE's asset base and the related FSAs) have to be considered against the dark sides—the new challenges and costs associated with such globalization (Table 3). They warn against overestimating the nonlocation boundedness of FSAs and underestimating the need to engage in novel resource recombination and orchestration as a complement to the extant FSA reservoir (Lanzolla et al., 2021). We build on Verbeke and Hutzschenreuter (2021) by focusing on how the DOI moderates the relationship between digitalization and firm performance.

We redirect attention from the internationalization–performance relationship (Arte & Larimo, 2021; Denicolai et al., 2021) to the moderating role of internationalization (S. Cho & Kim, 2017) in the digitalization–performance relationship suggested by our resource-orchestration-based framework. Our theoretical logic is grounded in the three dimensions of digital resources (firm-specific digital resources, digital-network resources, and digital-synchronization capabilities), and the resource-utilization and orchestration phases of digitalization. These dimensions and phases are linked to the new OLI advantages and three levels of digital globalization acknowledged in Verbeke and Hutzschenreuter (2021): (1) resources/assets, (2) governance (e.g., digital-network governance), and (3) customer value (e.g., positive network externalities).

According to Luo (2021), the traditional OLI advantages are weakened by digital forces and resulting digital global connection (Luo, 2021). Hence, firms that continue to rely more on traditional than new OLI advantages may not see their digitalization efforts sufficiently rewarded in the marketplace compared to their rivals who transform more swiftly to develop stronger new OLI advantages. Moreover, while digital resources confer benefits to the firm, they are costly to acquire and it takes time to develop and master practices underpinning their utilization and orchestration. Therefore, there is potential for high DOI to enhance the positive impact of high-level digitalization on performance through the learning, scale and network effects derived from their better global resource orchestration (Zeng et al., 2021). There are also negative effects of high-level outward internationalization on the digitalization–performance relationship (at high- and medium-level digitalization), due to the dark sides of digital globalization (Verbeke & Hutzschenreuter, 2021), global digital-connectivity risks (Nambisan & Luo, 2022) and digitization risks in IB (Luo, 2022a).

Internationalization acts as a moderator of the digitalization–performance relationship in several ways. First, high-level outward internationalization can positively impact benefits of digitalization to firm performance. Growth benefits of high digitalization (e.g., innovation and quality improvements) can be expected to be higher for firms with high DOI, as they have typically built stronger digital-related capabilities facilitating digital innovation (Du et al., 2022). For example, international presence creates more opportunities for utilization and orchestration of digital resources such as big data. Larger international presence results in richer data, and big data analytic capability can help MNEs identify loyal and profitable customer segments (Agarwal & Dhar, 2014). There are also synergies between internationalization and digital-enabled innovation due to MNEs' abundant resources and established reputation due to their large international presence (Juergensen et al., 2021). Higher internationalized firms can also expect more synergy between their internal and external networks (Meyer et al., 2011; Scott-Kennel & Saittakari, 2020) through accessing digital-network resources and linkage advantages (better-connected interfirm linkages and better-orchestrated intra-firm linkages). Finally, there are efficiency benefits of DOI, as big data analytic capability (based on superior data at highly internationalized firms) can help MNEs optimize operations, thus improving performance (Agarwal & Dhar, 2014).

It is also important to recognize the impact of high-level internationalization on the dark sides of digitalization. Coordination and complexity costs of digitalization can be both positively and negatively affected by high DOI. On one hand, worldwide organizational learning can help highly internationalized firms to improve their coordination of digital technologies and reduce some of the costs of digital complexity (Luo, 2022b; Mees-Buss et al., 2019). At MNEs with high DOI, leaders are relatively better positioned to use digital technologies to improve their organization's digital architecture to better design a global value-chain system and manage other cross-border flows in an orchestrated manner (Buckley & Strange, 2015) to enhance digital global connectivity (Luo, 2022b; Nambisan & Luo, 2022).

On the other hand, information overload from operations in multiple markets can reduce managers' efficiency in coordinating the firm's activities. Thus, resources from diverse markets may not be better utilized and orchestrated to create advantages for innovation development (Xie et al., 2021). Internationalization can also increase the complexity costs of digital innovation (Yoo et al., 2010) and digital-resource recombination (Lanzolla et al., 2021). More broadly, it is important to recognize various dimensions of foreignness (Lu et al., 2021) that can be associated with a higher DOI. Overcoming liabilities related to digital internationalization—e.g., liability of disruption (Marano et al., 2020)—is costly and may require learning across multiple markets to leverage digital resources effectively. This learning may be difficult to achieve along with digitalization, as highly internationalized firms are more exposed to digital interdependence risk, global information and cybersecurity risk and digital regulatory-complexity risk (Luo, 2022a).

The factors discussed above can therefore, together, be expected to lead to a positive digitalization–performance relationship at relatively high-level internationalization and digitalization. At relatively high-level internationalization and medium- or low-level digitalization, the beneficial effects of internationalization may not be significant enough and can be substantially tempered by the detrimental effects on the digitalization–performance relationship. Taken together, we propose:

Hypothesis 2. (H2). A firm's degree of outward internationalization moderates the relationship between digitalization and firm performance in such a way that relatively high-level internationalization increases the performance gains attributable to high-level digitalization.

2.3. The interplay of inward FDI and digitalization

While external-market factors are important moderators in the digitalization–performance relationship, the moderating role of inward internationalization and FDI in the home country is underexplored (Verhoef et al., 2021). Sirmon et al. (2011) acknowledge the role of competitive dynamics and rivalry, which can be spurred by high-FDI inflows in the home market (Chang & Xu, 2008), as an important consideration for research on resource orchestration. The FDI spillovers literature (Aitken & Harrison, 1999; Eapen, 2012), in conjunction with Luo's (2021) new OLI advantages and resource-orchestration theory, can add insights into the digitalization–performance relationship. Both inter- and intra-industry FDI spillovers (Javorcik, 2004; Orlic et al., 2018) are potentially enhancing the positive digitalization–performance relationship at high-level digitalization, as foreign subsidiaries can be vehicles of Industry 4.0 transformation in the host economy (Jankowska

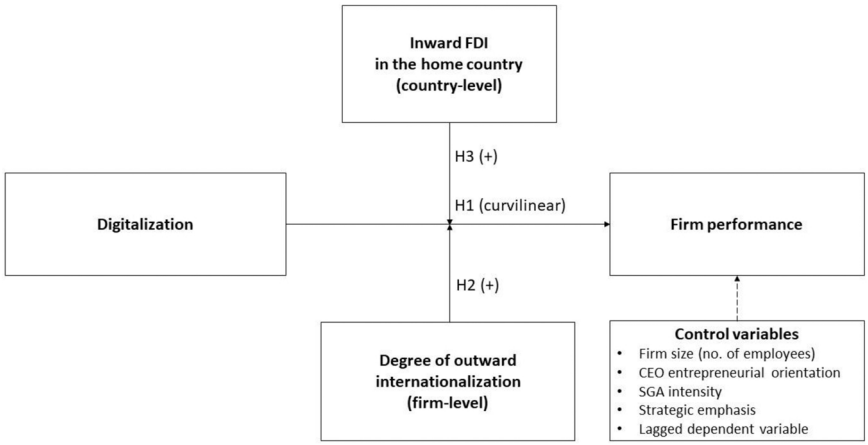

Fig. 3. Research model.

et al., 2021).

There are several reasons why high home-country-FDI inflows positively moderate the digitalization–performance relationship. First, high FDI can enhance the benefits of high digitalization to firm performance. Research on cross-sectoral FDI spillovers shows that local manufacturing firms can benefit from the presence of foreign firms in a variety of sectors in the economy (Javorcik, 2004; Orlic et al., 2018). Notably, these include positive interindustry (vertical) knowledge spillovers from upstream knowledge-intensive services and the downstream manufacturing sector (Orlic et al., 2018). There are also knowledge spillovers to local manufacturing firms from intra-industry FDI inflows (horizontal spillovers). These can be positive (e.g., via demonstration effects) but also insignificant or negative, as worker mobility and competition effects can be both positive and negative (Becker et al., 2020; Meyer & Sinani, 2009).

The balance of vertical- and horizontal-spillover effects on local firms' capacity to transform digitalization into firm performance depends on their absorptive capacity (Girma, 2005). Firms investing in digitalization projects increase their absorptive capacity to benefit from high inward FDI, particularly from the most recent inflows embodying new knowledge relevant to converting digitalization into growth and efficiency (Beckmann & Czudaj, 2017). The digitalization investments of local firms also improve their capability to respond to stronger competition from MNEs, and improve incentives and capability to attract digitally skilled staff and learn from foreign affiliates (Proeger & Runst, 2020). This can in turn help to increase growth and efficiency benefits of digitalization and convert them into profits.

The role of FDI in the digitalization–performance relationship is also affected by how high inward FDI impacts the costs of high digitalization to firm performance. H1 argues that while complexity costs of digitalization can potentially remain high at high digitalization levels, coordination costs may start decreasing because of better-developed coordination capabilities due to digitalization. FDI inflows can further contribute to this. For example, Jankowska et al. (2021) show that foreign subsidiaries serve as vehicles of digital transformation in the host economy, and contribute to the development of local firms' digital capabilities. Flows of advanced knowledge from MNE investments in subsidiaries (Ingršt & Zámborský, 2021; J. Lee et al., 2020) can lead to spillovers of advanced knowledge to local firms (Jacobs et al., 2017). For example, Perri and Peruffo (2016) suggest that MNEs' superior coordination capabilities can be transferred to foreign subsidiaries; this can, in turn, reduce their digitalization-related coordination costs and boost performance.

However, the success of digital transformation for local firms depends on the embeddedness of foreign subsidiaries in the local environment (Jankowska et al., 2021). The impact of FDI on benefits and costs of digitalization to firm performance may only be achieved if digitalization-related knowledge sharing is effective (Lepore et al., 2022). Digital technologies may increase knowledge sharing in the face of geographical distance, but this will not necessarily be productive without effective human resource management processes (Mabey & Zhao, 2017). Digitalization may also inhibit knowledge exchange (Newell et al., 2001). Moreover, knowledge-spillover effectiveness depends on digitization-related-knowledge filters for firm decision making, which take time to develop (Proeger & Runst, 2020). Overall, the net effects of FDI on the digitalization–performance relationship suggest that high-level FDI inflows will be conducive to high-level digitalization positively effecting firm performance.

This reasoning is consistent with Luo's (2021) insight that digitalization results in growing externalization gains, incentivizing firms to develop abilities to utilize and orchestrate external resources and networks to augment their traditional internalization advantages through linkage advantages (better-connected interfirm linkages). Open-resource advantage suggests that more global resources are available (e.g., increasingly valuable foreign-subsidiary resources), and highly digitalized firms can be advantageous in utilizing these resources thanks to built-up absorptive capacity. Linkage advantages imply better-connected interfirm linkages (conduits of spillovers) and better-orchestrated intra-firm linkages (leveraging resources from FDI spillovers for better firm performance). Integration advantages suggest better external connectivity, fostering knowledge-transfer efficiency (Luo, 2022b), and digital technologies helping with better global synchronization of activities enhanced by FDI spillovers.

In summary, local firms can convert knowledge gained from foreign subsidiaries to increase benefits and reduce costs of digitalization, by tapping into new OLI advantages, and improve utilization and orchestration of digital resources. Taken together, we hypothesize:

Hypothesis 3. (H3). FDI inflows into a country moderate the relationship between digitalization and local firm performance in such a way that relatively high-level FDI inflows increase the performance gains attributable to high-level digitalization.

To integrate our hypotheses, we develop a research model (Fig. 3). In the next section, we explain our methodology.

3. Methodology

3.1. Data and sample

We test our hypotheses with a sample of 571 U.S. manufacturing firms. U.S. manufacturing is an appropriate context for this study, as there is an important and unresolved debate about the decline of U.S. manufacturing (Contractor, 2021). Digitalization and internationalization are highly relevant factors in resolving the debate (McKinsey &

Table 5
Constructs and definitions.

Construct	Definition	References	Measure (source)
Firm performance (dependent variable) *Company Profitability*	Company profitability Earnings before interest and taxes (EBIT)	Capkun et al., 2009;Chen & Hsu, 2010	Natural logarithm (ln) of EBIT. Robustness check: return on assets (ROA). Source: SEC and Thomson Reuters
Digitalization *Digit*	A firm's utilization and orchestration of digital resources. Digitalization score is calculated as an annual word count divided by total words for every annual report and normalized to a scale from 0 to 1 (maximum value in the baseline sample)	Autio et al., 2021;Hanelt et al., 2021; Kristoffersen et al., 2021;Luo, 2021;Sirmon et al., 2007, 2011;Verbeke & Hutzschenreuter, 2021;Verhoef et al., 2021	Computer-aided text-analysis keywords: *digital* , internet, internet-of-things, internet of things, IoT, remote, Industry 4.0, smart solution, smart product, autom* , data* , monit* , information technology, tech* , information system, syst* , IT, advanced, manuf* , telemati* , artificial intelligence, AI, intelli* , machine learning, learn* ,* and *robot** . Source: SEC and Thomson Reuters
Degree of outward internationalization *DOI*	The degree to which total firm sales are derived from foreign sales	Abdi & Aulakh, 2018;Boly et al., 2019; Bowen, 2007	Foreign sales/total sales (in %). Source: SEC and Thomson Reuters
Foreign assets/total assets *FATA* (robustness check)	A ratio of foreign assets to total assets of the firm	Casella & Formenti, 2018;Eckert et al., 2010	Foreign assets/total assets (%). Source: SEC and Thomson Reuters
Foreign direct investment (country level) *FDI*	Net-FDI inflows to home country of the firm	Beckmann & Czudaj, 2017;Burlea-Schiopoiu et al., 2021	Net-FDI inflows in home country (US) as % of GDP Source: World Bank
FDI industry (industry level) *FDIind* (robustness check)	Net-FDI inflows to the firm's industry in the home country of the firm	Keller & Yeaple, 2009;Kosová, 2010;Orlic et al., 2018	Net-FDI inflows in a two-digit SIC industry/ value added Source: Bureau of Economic Analysis
Firm size *ln employees*	Number of employees	Chen & Hsu, 2010;Kindermann et al., 2021	ln of the number of employees. Source: SEC and Thomson Reuters
CEO entrepreneurial orientation *ln ceoeo*	Autonomy, innovativeness, proactiveness, competitive aggressiveness, risk-taking	Bhandari et al., 2020;Liu & Xi, 2021	Source: keywords based on Short et al. (2010) and Bhandari et al. (2020). Please seeTable A1 for details. In ln form
SGA intensity *sgasales*	Selling, general & administrative (SGA) expenditures/ sales	Barker & Duhaime, 1997;Chen & Hsu, 2010; I.Lee & Rugman, 2012	Source: SEC and Thomson Reuters (in %)
Strategic emphasis *stratempha*	(SGA expenditures—R&D expenditures)/assets	Chen & Hsu, 2010;Mizik & Jacobson, 2003	Source: SEC and Thomson Reuters (in %)
R&D intensity *rdsales* (robustness check)	Research & development expenditures/sales	Chen & Hsu, 2010; C.Lee & Wu, 2016	Source: SEC and Thomson Reuters (in %)

Company, 2021). For this study, we collected data from 1992 to 2019, with the starting date set around the period when both the internet supply and demand and its intensity of use (in U.S. manufacturing and globally) had started growing rapidly (Bojnec & Fertö, 2009). We collected data using the following steps. First, we obtained annual filings for companies with a Standard Industrial Classification (SIC) code between 3500 and 3600 from the U.S. Securities and Exchange Commission's (SEC) database (www.sec.gov), giving us 1208 companies and 37, 690 filings. Next, we removed 10-K405 and 10-KSB filings (small--business filings) from the data as these did not contain sufficiently detailed data for our analysis. This produced 930 companies and 6148 filings. Next, we collected the financial data from Refinitiv Eikon database and connected to the annual reports. The connection used a multistep verification procedure. The Eikon database does not recognize the Central Index Key (CIK) code the SEC uses for company identification. Thus, we used the Python programming language (Rossum, 1995) to match the CIK code to the ticker symbol for each firm, which we then connected to the financial data. In this procedure, we used the SEC database, Eikon, and the PermID (www.permid.org) offered by Thomson Reuters. Overall, we reliably connected the annual reports and financial data for 571 companies and 6088 10-K filings with 1215 firm-year observations in the baseline sample (including controls). We cleaned the 10-K filings of all unnecessary information. This process removed all the HTML and similar segments from the documents, leaving only the textual information. Python programming language and the Natural Language Toolkit library were used to clean the annual reports (Bird et al., 2009).

3.2. Variables

Our main variables are summarized in Table 5 along with relevant references, definitions and sources. Below are further descriptions of the variables.

3.2.1. Firm performance

Our dependent variable measuring firm performance is earnings before interest and taxes (EBIT), as used in previous research on internationalization, resource allocation and firm performance (Chen & Hsu, 2010) and in the context of U.S. manufacturing (Capkun et al., 2009). Some studies use return on assets (ROA; e.g., Gomes-Casseres et al., 2019) or Tobin's Q (Bhandari et al., 2020; Brown & Caylor, 2006) as firm-performance measures. Rather than promoting the lower asset level in the company and hence allowing the manufacturing to be outsourced, we think understanding the true profit potential of digitalization in absolute profitability is a better option without indexing with assets or other similar denominators used in the financial analysis (Palliam, 2006). However, we run a robustness check using ROA as a dependent variable.

3.2.2. Digitalization

For measuring digitalization, we use a process of first defining the keywords from the digitalization literature (e.g., Hanelt et al., 2021; Verhoef et al., 2021) and grounding them in research-orchestration literature (e.g., Kristoffersen et al., 2021; Sirmon et al., 2011; J. Wang, Xue, et al., 2020) and our definition and conceptualization of digitalization (Table 2). Then we use GloVe 300, a Stanford

Table 6
Summary statistics and correlation table.

Variable	Mean	S. D.	1	2	3	4	5	6	7	8
1 ln EBIT	10.68	2.32	1							
2 Digit	0.22	0.16	0.28 * **	1						
3 DOI	34.93	24.57	0.08 * **	-0.02	1					
4 FDI	1.67	0.78	0.04 *	0.05 * **	0.06 * **	1				
5 ln ceoeo	2.1	0.64	0.04	0.05 * **	-0.01	0.02	1			
6 sgasales	337.45	7704.25	-0.22 * **	-0.02	-0.03 *	-0.00	-0.07 * **	1		
7 ln employees	7.06	2.36	0.89 * **	0.23 * **	0.07 * **	-0.06 * **	0.05 * *	-0.05 * **	1	
8 stratempha	27.52	393.38	-0.13 * **	0.01	-0.04 * **	0.00	0.01	-0.00	-0.15 * **	1

Note: N = 1215. *p < 0.05, * *p < 0.01, * **p < 0.001

Table 7
Variance inflation factor analysis.

	VIF	1/VIF
Variable	Main specification (Table 8)	
Digit	1.04	0.96
DOI	1.17	0.85
FDI	1.11	0.90
ln employees	1.12	0.89
stratempha	1.24	0.80
ln ceoeo	1.04	0.96
sgasales	1.10	0.91
Mean VIF	1.12	0.89

VIF = Variance inflation factor

University-developed Global Vectors application that represents words as vectors, to augment that dictionary through ML algorithms that infer additional digitalization-related words and phrases used in annual reports. The GloVe 300 model, trained with 6 billion tokens, was used to infer, in a 300-dimensional word vector space, semantically similar words and phrases to those from digitalization literature, thus improving the efficiency of our initial dictionary. The metric is measured annually at the firm level between 1992 and 2018. Digitalization scores are calculated as annual word count divided by total words for every annual report and normalized to a scale from 0 to 1 (maximum value in the baseline sample).

To our knowledge, we are the first to develop the keywords needed for such analysis through digitalization literature and language models. A related CATA-based measure of digital orientation was developed by Kindermann et al. (2021), and shows a 45% growth in the digital-orientation measure between 2001 and 2016. This is consistent with our data (where digitalization rose from 0.122 to 0.177 in 2001–2016). Content analysis of annual reports has been used in digitalization research before (Ricci et al., 2020). In line with suggestions of McKenny et al. (2018) and best practice in CATA analysis (Nag et al., 2007), we have manually coded 10% of the sample texts with human coders. The Cohen's kappa value of coding agreement between machine and human coding was 0.61, indicating substantial interrater agreement (Landis & Koch, 1977). The advantages of our CATA-based measure compared to other digitalization measures (e.g., surveys and interviews) include its compatibility with longitudinal research (Duriau et al., 2007), nonintrusiveness (Barr et al., 1992); and its ability to analyze larger data volumes (Short et al., 2010) and capture attributes that are difficult to quantify through other method (Tetlock et al., 2008). The disadvantage of our measure is that it may not necessarily capture actual behavior (Covin & Wales, 2019). The measure is best suited in our case because our resource-orchestration theory-based conceptualization of digitalization attempts to capture more than IT investments. It is the utilization and orchestration of digital resources (e.g., big data decision analytics) that create value (Carlsson, 2018; Kohli & Grover, 2008).

The final keywords used for digitalization were: *digital**, *internet, internet-of-things, internet of things, IoT, Industry 4.0, smart solution, smart product, autom**, *data**, *remote, monit**, *information technology, tech**, *information system, syst**, *IT, advanced, manuf**, *telemati**, *artificial intelligence, AI, intelli**, *machine learning, learn**, and *robot**.

3.2.3. Degree of outward internationalization

DOI is measured as foreign sales to total sales (%). This is consistent with Abdi and Aulakh (2018) and Bowen (2007), who suggest this is the most common measure of DOI. As a robustness check, we also use foreign assets/total assets (FATA), following Casella and Formenti (2018) and Eckert et al. (2010).

3.2.4. FDI

FDI is measured as net-FDI inflow (% of GDP). This is consistent with the approaches of Beckmann and Czudaj (2017), Boly et al. (2019) and Burlea-Schiopoiu et al. (2021). To distinguish between country and intra-industry FDI effects (Orlic et al., 2018), we have also constructed an industry-level equivalent of this variable (net-FDI inflows/value added at two-digit SIC level linked to four-digit SIC level of a firm).

3.2.5. Control variables

The system-generalized method of moments (GMM) uses lagged dependent variables to control for the unobserved heterogeneity and impact of past performance on the following year's firm performance. This reduces the need for multiple control variables in the specification (Carlson & Wu, 2012; Woolridge, 2009). Building on previous RBV-based research on profitability determinants (Barker & Duhaime, 1997; Chen & Hsu, 2010; Kindermann et al., 2021; I. Lee & Rugman, 2012; Liu & Xi, 2021), we include firm size (number of employees: *employees*); selling, general and administrative (SGA) intensity (SGA expenditures/sales: *sgasales*); CEO entrepreneurial orientation (*ceoeo;* see Table A1 for measurement details); and strategic emphasis ([SGA expenditures–R&D expenditures]/assets: *stratempha*) as controls.

3.3. Empirical model specification

We specify several models to test our hypotheses. The following equation shows the model testing H1:

$$Firmperformance_{i,t} = \alpha_0 + \alpha_1 Digitalization_{i,t-1} + \alpha_2 Digitalization_{i,t-1}{}^2 + \alpha_3 Digitalization_{i,t-1}{}^3 + \varphi Controlvariables_{i,t-1} + \varepsilon_{it}$$

Table 8
System GMM regression models with Company Profitability (EBIT) as a dependent variable.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent variable: ln of Company Profitability (earnings before interest and taxes)					
	Model with controls	Model with digitalization	H1 quadratic model	H1 cubic model	H2 (DOI)	H3 (FDI)
Digitalization (Digit)		3.413 * **	-3.357 * **	3.300	-0.640	1.109 * **
		(0.347)	(0.806)	(3.593)	(3.033)	(0.212)
Digit squared			9.081 * **	-9.887	7.576	–
			(0.868)	(10.178)	(7.289)	
Digit cubed				13.784 *	-3.844	1.761 * **
				(7.331)	(4.594)	(0.219)
DOI					-0.010 * *	
					(0.004)	
DOI*Digit					0.181 * **	
					(0.047)	
DOI*Digit squared					-0.478 * **	
					(0.117)	
DOI*Digit cubed					0.289 * **	
					(0.075)	
FDI						–
FDI*Digit						-0.449 * **
						(0.033)
FDI*Digit squared						–
FDI*Digit cubed						0.250 * **
						(0.062)
FDI industry						
FDI industry *Digit						
FDI industry* Digit squared						
FDI industry* Digit cubed						
Control variables						
ln Company Profitability (lagged)	0.276 * **	0.236 * **	0.222 * **	0.216 * **	0.210 * **	0.182 * **
	(0.006)	(0.005)	(0.006)	(0.006)	(0.009)	(0.005)
ln Employees (lagged)	0.724 * **	0.714 * **	0.660 * **	0.687 * **	0.730 * **	0.778 * **
	(0.015)	(0.010)	(0.013)	(0.016)	(0.018)	(0.017)
ln CEO EO (lagged)	0.093 * **	0.120 * **	0.112 * **	0.114 * **	0.122 * **	0.097 * **
	(0.004)	(0.005)	(0.005)	(0.006)	(0.007)	(0.004)
SGA intensity (lagged)	-0.003	-0.006 * **	0.005 * **	0.009 * **	-0.014 * **	-0.003
	0.002	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Strategic emphasis (lagged)	0.002 * **	0.002 * **	0.001 * **	0.001 * **	0.002 * **	0.002 * **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.086 * **	1.893 * **	2.989 * **	2.259 * **	2.519 * **	2.404 * **
	(0.152)	(0.166)	(0.141)	(0.355)	(0.279)	(0.146)
AR (1) *p*-value	0	0	0	0	0	0
AR (2) *p*-value	0.524	0.425	0.418	0.405	0.322	0.340
Observations	1215	1215	1215	1215	1215	1215
Number of groups	134	134	134	134	134	134

Note: standard errors in parentheses. * ** $p < 0.01$, * *$p < 0.05$, *$p < 0.1$. All independent and control variables are lagged by 1 year. Time dummies were used as controls. ln = natural logarithm. AR (1) = the Arellano-Bond test for the first-order auto-regressive model in first differences. AR (2) = the Arellano-Bond test for the second-order auto-regressive model in first differences. Hansen test on the overidentification of the instruments showed robust results, with p-value of the Hansen J-statistic over 0.05. "–" denotes a variable omitted or dropped by Stata (statistical software) to assure robustness.

In this equation, i indicates the individual firm taken from our sample and t represents the year investigated. Firm performance i,t represents the firm-level performance for company i in year t; and ε_{it} is the disturbance term. The subscript $t-1$ represents data from the previous year. Following suggestions of Haans et al. (2016), the cubic term was used to test the different hypothesized effects of high compared to medium digitalization (although we also conduct checks for quadratic model and linear model with digitalization). Our H1 will be supported if coefficients are negative or insignificant for digitalization, insignificant or positive for digitalization squared, and positive for digitalization cubed. To test H2, we add the DOI variable including interactions with three orders of digitalization:

$$\begin{aligned}\boldsymbol{Firmperformance}_{i,t} = {} & \boldsymbol{\alpha}_0 + \boldsymbol{\beta}_1(\boldsymbol{DOI}_{i,t-1}) + (\boldsymbol{\alpha}_1 + \boldsymbol{\beta}_2\boldsymbol{DOI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1} + (\boldsymbol{\alpha}_2 + \boldsymbol{\beta}_3\boldsymbol{DOI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1}{}^2 + (\boldsymbol{\alpha}_3 + \boldsymbol{\beta}_4\boldsymbol{DOI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1}{}^3 \\ & + \boldsymbol{\varphi}\boldsymbol{Controlvariables}_{i,t-1} + \boldsymbol{\varepsilon}_{it}\end{aligned}$$

To test H3, we add the FDI variable including interactions in the following model:

$$\begin{aligned}\boldsymbol{Firmperformance}_{i,t} = {} & \boldsymbol{\alpha}_0 + \boldsymbol{\gamma}_1(\boldsymbol{FDI}_{i,t-1}) + (\boldsymbol{\alpha}_1 + \boldsymbol{\gamma}_2\boldsymbol{FDI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1} + (\boldsymbol{\alpha}_2 + \boldsymbol{\gamma}_3\boldsymbol{FDI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1}{}^2 + (\boldsymbol{\alpha}_3 + \boldsymbol{\gamma}_4\boldsymbol{FDI}_{i,t-1})\boldsymbol{Digitalization}_{i,t-1}{}^3 \\ & + \boldsymbol{\varphi}\boldsymbol{Controlvariables}_{i,t-1} + \boldsymbol{\varepsilon}_{it}\end{aligned}$$

H2 will be confirmed if the coefficient on DOI times digitalization cubed is positive. H3 will be confirmed if the coefficient on FDI times digitalization cubed is positive. As robustness checks, we test for

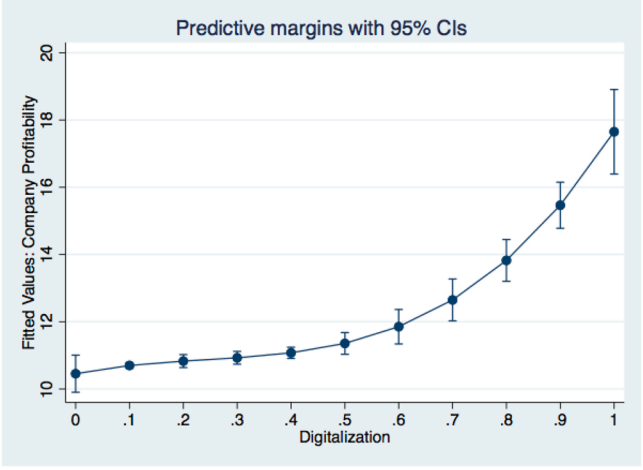

Fig. 4. Margins plot of digitalization's impact on company profitability (ln EBIT). Note: CI = confidence interval. ln EBIT = natural logarithm of earnings before interest and taxes.

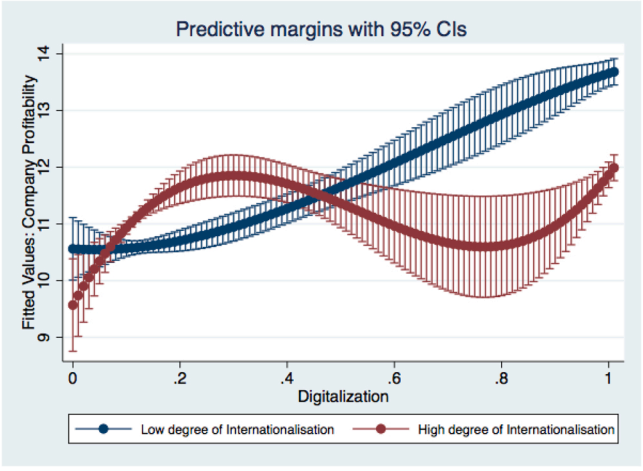

Fig. 5. Moderating effect of DOI on the digitalization–company-profitability relationship. Note: CI = confidence interval.

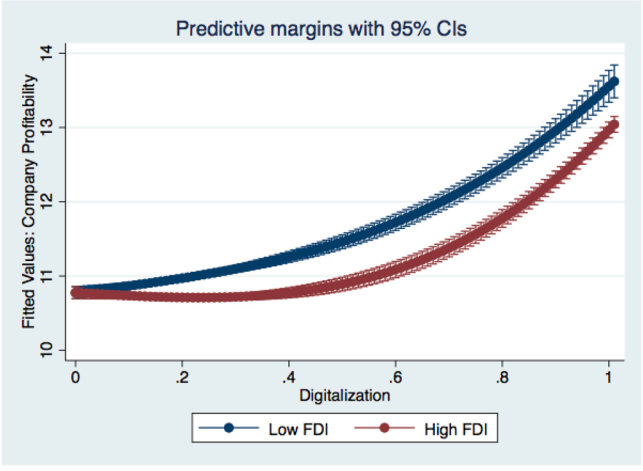

Fig. 6. Moderating effect of FDI on the digitalization–company-profitability relationship. Note: CI = confidence interval.

Table A1
CEO Entrepreneurial orientation measure.

Dimension of CEO entrepreneurial orientation	Computer-aided text-analysis (CATA) keywords
Autonomy	At-liberty, authority, authorization, autonomic, autonomous, autonomy, decontrol, deregulation, distinct, do-it-yourself, emancipation, free, freedom, free-thinking, independence, independent, liberty, license, on-one's-own, prerogative, self-directed, self-directing, self-direction, self-rule, self-ruling, separate, sovereign, sovereignty, unaffiliated, unattached, unconfined, unconnected, unfettered, unforced, ungoverned, unregulated
Innovativeness	Ad-lib, adroit, adroitness, bright-idea, change, clever, cleverness, conceive, concoct, concoction, concoctive, conjure-up, create, creation, creative, creativity, creator, discover, discoverer, discovery, dream, dream-up, envisage, envision, expert, form, formulation, frame, framer, freethinker, genesis, genius, gifted, hit-upon, imagination, imaginative, imagine, improvise, ingenious, ingenuity, initiative, initiator, innovate, innovation, inspiration, inspired, invent, invented, invention, inventive, inventiveness, inventor, make-up, mastermind, master-stroke, metamorphose, metamorphosis, neoteric, neoterism, neoterize, new, wrinkle, innovation, novel, novelty, original, originality, originate, origination, originative, originator, patent, radical, recast, recasting, resourceful, resourcefulness, restyle, restyling, revolutionize, see- things, think-up, trademark, vision, visionary, visualize
Proactiveness	Anticipate, envision, expect, exploration, exploratory, explore, forecast, fore- a glimpse, foreknow, foresee, foretell, forward-looking, inquire, inquiry, investigate, investigation, look-into, opportunity-seeking, proactive, probe, prospect, research, scrutinization, scrutiny, search, study, survey
Competitive aggressiveness	Achievement, aggressive, ambitious, antagonist, antagonistic, aspirant, battle, battler, capitalize, challenge, challenger, combat, combative, compete, comp- enter, competing, competition, competitive, competitor, competitor, conflicting, contend, contender, contentious, contest, contestant, cutthroat, defend, dog-eat-dog, enemy, engage, entrant, exploit, fierce, fight, fighter, foe, intense, intensified, intensive, jockey-for-position, joust, jouster, lock-horns, opponent, oppose, opposing, opposition, play-against, ready-to-fight, rival, spar, strive, striving, struggle, tussle, vying, wrestle
Risk-taking	Adventuresome, adventurous, audacious, bet, bold, bold-spirited, brash, brave, chance, chancy, courageous, danger, dangerous, dare, daredevil, daring, dauntless, dicey, enterprising, fearless, gamble, gutsy, headlong, incautious, intrepid, plunge, precarious, rash, reckless, risk, risky, stake, temerity, uncertain, venture, venturesome, wager
Additional inductively derived words	Advanced, advantage, commercialization, customer-centric, customized, develop, developed, developing, development, developments, emerging, enterprise, enterprises, entrepreneurial, exposure, exposures, feature, features, founding, high-value, initiated, initiatives, innovations, innovative, introductions, launch, launched, leading, opportunities, opportunity, originated, outdoing, outthinking, patents, proprietary, prospects, prototyping, pursuing, risks, unique, ventures

Source: Short et al. (2010) and Bhandari et al. (2020).

industry-level FDI (FDI industry) and DOI measured as FATA. In the empirical models, we use a logarithmic transformation (natural logarithm) of the variables measured in units (EBIT, *employees* and *ceoeo*).

4. Results

Table 6 presents summary statistics of major variables in the baseline

Table A2
Robustness checks (system GMM regression models with EBIT as a dependent variable).

	(7)	(8)
Variables	Dependent variable: ln of Company Profitability (Earnings before interest and taxes)	
	H2(FATA)	H3(FDI industry)
Digitalization (Digit)	-14.27 * **	1.811
	(4.19)	(3.199)
Digit squared	30 * **	–
	(8775)	
Digit cubed	-14.654 * **	-6.125
	(4.819)	(9.308)
FATA	0.01 * *	
	(0.004)	
FATA*Digit	-0.145 *	
	(0.056)	
FATA*Digit squared	0.292 * *	
	(0.139)	
FATA*Digit cubed	-0.146	
	(0.089)	
FDI industry		19.09
		(14.07)
FDI industry		-293.1 *
*Digit		(160.1)
FDI industry*		942.0 *
Digit squared		(552.6)
FDI industry*		-664.5
Digit cubed		(538.9)
Control variables		
ln Company Profitability	0.193 * **	0.397 * **
(lagged)	(0.014)	(0.070)
ln Employees	0.786 * **	0.824 * **
(lagged)	(0.042)	(0.112)
ln CEO EO	0.075 * **	0.031
(lagged)	(0.024)	(0.094)
SGA intensity	0.004	0.000
(lagged)	(0.007)	(0.011)
Strategic emphasis	0.003 * **	0.011 * **
(lagged)	(0.000)	(0.004)
Constant	3.865 * **	–
	(0.613)	
AR (1) *p*-value	0.000	0.031
AR (2) *p*-value	0.118	0.801
Observations	627	372
Number of groups	96	55

Note: standard errors in parentheses. * ** $p < 0.01$, * *$p < 0.05$, *$p < 0.1$. All independent and control variables are lagged by 1 year. Time dummies were used as controls. ln = natural logarithm. FATA = foreign assets/total assets. AR (1) = the Arellano-Bond test for the first-order auto-regressive model in first differences. AR (2) = the Arellano-Bond test for the second-order auto-regressive model in first differences. Hansen test on the overidentification of the instruments showed robust results, with p-value of the Hansen J-statistic over 0.05. "–" denotes a variable omitted or dropped by Stata (statistical software) to assure robustness.

sample and the correlation table. There are no concerning correlations between independent variables. We calculated variance inflation factors (VIFs) for each explanatory variable in the analyzed models. All of the VIF values were under 2, indicating that multicollinearity was not severe (Table 7). To test our hypotheses, we employed a stepwise panel regression with the system GMM estimator (Blundell & Bond, 2000). The system GMM estimator uses lagged levels of the series as instruments for first-difference equations, and first differences as instruments for equations in levels. Its advantage is that it controls for the individual effect of unobserved heterogeneity. We control this heterogeneity in firms to avoid biased results by modeling it as individual effects. The system GMM also reduces the problem of endogeneity (the error term correlated with any of the explanatory variables) by embedding the use of instrumental variables.

In our estimation procedure, due to a large number of variables and years in our dataset, we limited the number of instruments to the first available lagged levels to avoid overfitting bias. The instruments for first-difference equation included year dummy variables and 1-year lags of all relevant independent and control variables. Additionally, we employed instruments for levels equations and valid GMM-type instruments. We also conducted a Hansen test of the correlation between the instruments and the random disturbance (Hansen, 1982). Hansen test values suggested that main models used in hypotheses testing were robust and not overidentified, validating our model specifications. With the first model (Model 1) in Table 8, we built a control model with lagged dependent variable, firm size, *ceoeo*, SGA intensity and strategic emphasis. Following this, we introduced first-, second-, and third-order digitalization in Models 2, 3 and 4 respectively.

Linear Model 2 indicates that, overall, one percentage-point increase in digitalization on a 0–100-point scale leads to about 29% increase in EBIT. Model 3 (where coefficient on digitalization is −3.357 with $p < 0.01$ and coefficient on digitalization squared is 9.081 with $p < 0.01$) supports H1. In Model 4, the coefficient on digitalization cubed is 13.784 ($p < 0.1$) while coefficients on digitalization and digitalization squared are insignificant, confirming H1. Fig. 4 graphically represents the digitalization–performance relationship. The relationship is curvilinear, with the initial weak relationship turning into a strongly positive slope at high-level digitalization. Overall, the results support H1, which predicted that coefficients will be negative or insignificant for digitalization, insignificant or positive for digitalization squared, and positive for digitalization cubed.

Results of Model 3 and 4 results are consistent with digitalization research that acknowledges the role of organizational change management as an important factor underpinning the digitalization–performance relationship (Armenakis & Bedeian, 1999; Hanelt et al., 2021). During the early phase of IT-/digitalization-infrastructure development, there is an insignificant or possibly negative effect on company profitability due to incurred initial investments. Once the critical mass of acceptance of the digitalization as a change process happens, digitalization's impact on profitability rises (Nograšek, 2011), as shown in the upward swing in Fig. 4 for digitalization levels of about 0.25–0.75. When change management succeeds and institutionalizes the digital-transformation changes, efficiency and effectiveness go even higher. This is reflected in the relatively steeper positive slope when digitalization is over 0.75.

To understand the effect of internationalization (H2), we introduced DOI as a moderator in Model 5. Results show a positive moderating effect of high-level DOI on the digitalization–performance relationship at high-level digitalization as hypothesized. The coefficient on the interacted term of DOI*Digitalization cubed is 0.289 ($p < 0.01$) in Model 5, supporting H2 that predicted a positive coefficient on DOI*Digitalization cubed. Fig. 5 shows the margins plots for the moderating effect of DOI as two distinct curves for the digitalization–performance relationship when DOI is low and high. The low-DOI curve is J-shaped, with an initial negative, or weak, and then positive relationship between digitalization and performance.

The curve for high-DOI observations is S-shaped. While a strong positive relationship is present at high-level digitalization from a turning point of about 0.75, supporting H2, the relationship is also strongly positive at low-level digitalization (coefficient of 0.181, $p < 0.01$) and strongly negative at medium-level digitalization (coefficient of −0.478, $p < 0.01$). This indicates that highly internationalized firms may initially benefit from digitalization more than less-internationalized firms (with bright sides of digitalization and digital globalization dominating the dark sides). However, at medium-level digitalization (between 0.25 and 0.75), the dark sides of digitalization and digital globalization may be more dominant than bright sides. This is consistent with research that cautions about the dark sides of digital globalization and digitization risks in IB (Luo, 2022a; Verbeke & Hutzschenreuter, 2021).

To test H3, we introduced FDI as a moderator in Model 6. Results show a positive moderating effect as hypothesized (positive coefficient of 0.25 on FDI*Digitalization cubed at $p < 0.01$). Fig. 6 shows the

margins plots for the moderating effect of FDI as two distinct curves for when FDI is low and high. Slopes of both curves turn positive from about 0.25 (with the high-FDI curve negative initially, with a coefficient of −0.449, $p < 0.01$). From about 0.75, the high-FDI curve becomes steeper than the low-FDI curve.

We ran several robustness checks (Table A2). First, we ran a specification with FATA as a measure of outward internationalization (Eckert et al., 2010). Moderating effects of FATA (Model 7) were weaker than effects of foreign sales/total sales. This is consistent with Casella and Formenti (2018). They found that in the digital economy, MNEs are shifting to asset-light international footprints, emphasizing foreign sales over foreign assets to benefit from digitalization. We also ran a specification with FDI at the industry level instead of country level (Model 8). Moderating effects of industry-level FDI were weaker than country-level FDI effects, in line with our expectations that industry-level competition effects may result in less significant FDI spillovers compared to more positive interindustry effects (Orlic et al., 2018). We also employed alternative model specifications, e.g., excluding *ceoeo* variable, replacing it with CEO market orientation (Olavarrieta & Friedmann, 2008), using R&D intensity instead of SGA intensity and ROA instead of EBIT. The results were comparable to our main models.

5. Discussion and conclusions

Our study using resource-orchestration theory complements new OLI advantages in explaining firm performance as a result of digitalization. The findings suggest that digitalization has a curvilinear relationship with firm performance, with the slope negative or relatively flat at low-level digitalization, and increasingly positive at relatively higher-level digitalization. Moreover, high-level DOI and FDI inflows increase the performance gains attributable to high-level digitalization. Our study advances efforts to integrate IB concepts and constructs (e.g., new OLI advantages, DOI, FDI) with the RBV (e.g., the resource-orchestration theory) in the digital world (e.g., Elia et al., 2021; Nambisan & Luo, 2022).

5.1. Theoretical implications

Resource-orchestration theory (Sirmon et al., 2011) helps to explain links between digitalization and firm performance, through interactions between resource-orchestration capability and digitalization aspects such as business-analytics capability (Kristoffersen et al., 2021). Luo's (2021) framework of new OLI advantages links in several ways to the resource-orchestration theory. For example, it stresses utilization of global resources as part of digitalization-enabled open-resource advantages, better-orchestrated intra-firm linkages as part of linkage advantages, and better synchronization of global activities as part of integration advantages.

The present study used the construct of DOI to capture the benefits of outward internationalization. DOI has been linked both directly (Abdi & Aulakh, 2018) and indirectly (S. Cho & Kim, 2017) to firm performance. However, research has not sufficiently conceptualized DOI as a moderator of digitalization's impact on firm performance. Additionally, FDI in the home country, driven by growing externalization gains and better-connected interfirm linkages (Luo, 2021), also moderates the digitalization–performance relationship. This insight connects to recent studies on FDI spillovers and digitalization (Auboin et al., 2021; Jankowska et al., 2021), extending them by drawing links to performance and stressing the deployment and bundling of next-generation digital technologies (J. Cho et al., 2022).

Our study integrates resource-orchestration theory with the new OLI advantages in explaining firm performance, responding to Pitelis and Teece's (2018) call to incorporate resource-orchestration theory into MNE theory. Resource-orchestration theory is consistent with definitions of MNEs as networked firms (Kogut & Zander, 1993; Mudambi & Swift, 2011). This underlies Luo's (2021) observations that external (global) resources are becoming more available and external networks offer more value to cope with the heightened velocity of global competition. We extend the resource-orchestration research in IB (e.g., Stoyanov et al., 2018) by distinguishing between resource-utilization and orchestration phases of digitalization and focusing on the implications for firm performance.

Our study makes three main contributions to the literature. First, we contribute to research on digitalization and firm performance (Björkdahl, 2020; Cappa et al., 2021). We suggest curvilinear effects as a result of the dark and bright sides of digitalization (Dąbrowska et al., 2022). This adds additional insights into the disputes about the financial outcomes of digital transformation (Kohtamäki et al., 2020), by aligning with studies suggesting moderated curvilinear effects (L. Li, 2022). Second, the present study contributes to the IB literature by demonstrating moderating mechanisms through which both outward (firm-level) and inward (home-country-level) internationalization impact the digitalization–performance relationship. Hence, we provide new knowledge on the role of digitalization and two levels of internationalization in firm profitability compared to extant studies stressing the impact of digitalization on firm-level internationalization (e.g., Bergamaschi et al., 2021; Denicolai et al., 2021). Lastly, we contribute to the research on digitalization and internationalization (e.g., Birkinshaw, 2022; Verbeke & Hutzschenreuter, 2021) by connecting it to resource-orchestration theory (Sirmon et al., 2011). We integrate resource-orchestration theory with the framework of new OLI advantages (Luo, 2021), showing how, together, they explain firm performance in the digital world.

5.2. Implications for practice

This study also provides insights for managers. Our results show that, overall, only the top quartile of digitalization efforts is rewarded by substantially higher profitability. This implies that only a sustained effort to improve bundles of digitalization practices is likely to result in superior firm performance (J. Cho et al., 2022; McKinsey & Company, 2019). We also find that highly internationalized firms may face more significant performance setbacks at medium-level digitalization compared to less-internationalized firms. This implies that relatively less-internationalized firms may consider prioritizing reaching high-level digitalization before high-level internationalization. Moreover, our results show that firms may enhance the success of their digitalization efforts by utilizing home-country FDI spillovers. For example, firms can leverage digitalization via FDI inflows to improve their performance by hiring employees with strong digital and analytics skills from foreign subsidiaries (e.g., chief digital officer and chief analytics officer) or attracting and developing digital talent to improve the organization's capacity to benefit from digitalization and FDI (Becker et al., 2020; Jaiswal et al., 2021).

5.3. Limitations and future research

A limitation of our study is that while we used an innovative method for measuring digitalization, it could also have been fruitful to employ survey-based research to operationalize our concepts through input from managers (Kristoffersen et al., 2021). Additional discourse in refining digitalization keywords would also be beneficial (Kindermann et al., 2021), as well as hypotheses testing in different countries. We see several other avenues for future research on resource orchestration, new OLI advantages and digitalization. Future studies could connect to research on Industry 4.0 technologies that are reshaping manufacturing and creating impetus for reshaping global value chains (Dachs et al., 2019). There also are opportunities to improve our understanding of how managerial orchestration underpins strategic responses to opportunities created by digitalization, and how organizational change relates to how digitalization results in performance (Hanelt et al., 2021). Fuzzy-set analysis can illuminate which configurations of resource

utilization and orchestration yield high performance. It would also be productive to connect new OLI advantages more closely to the literature on international diversification and innovation (Juergensen et al., 2021).

Data Availability

The data that has been used is confidential.

Appendix A

See Tables A1 and A2.

References

Abdi, M., & Aulakh, P. S. (2018). Internationalization and performance: Degree, duration, and scale of operations. *Journal of International Business Studies, 49*(7), 832–857.

Addas, S., & Pinsonneault, A. (2018). Email interruptions and individual performance: Is there a silver lining? *MIS Quarterly, 42*(2), 381–405.

Adner, R., Puranam, P., & Zhu, F. (2019). What is different about digital strategy? From quantitative to qualitative change. *Strategy Science, 4*(4), 253–261.

Agarwal, R., & Dhar, V. (2014). Big data, data science, and analytics: The opportunity and challenge for IS research. *Information Systems Research, 25*(3), 443–448.

Agarwal, R., Gao, G., DesRoches, C., & Jha, A. (2010). The digital transformation of healthcare: Current status and the road ahead. *Information Systems Research, 21*, 796–809.

Ahi, A. A., Sinkovics, N., Shildibekov, Y., Sinkovics, R. R., & Mehandjiev, N. (2021). Advanced technologies and international business: A multidisciplinary analysis of the literature. *International Business Review*, Article 101967 (Article).

Aitken, B. J., & Harrison, A. E. (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review, 89*(3), 605–618.

Amit, R., & Han, X. (2017). Value creation through novel resource configurations in a digitally enabled world. *Strategic Entrepreneurship Journal, 11*(3), 228–242.

Aral, S., & Weill, P. (2007). IT assets, organizational capabilities, and firm performance: How resource allocations and organizational differences explain performance variation. *Organization Science, 18*(5), 763–780.

Armenakis, A., & Bedeian, A. (1999). Organizational change: A review of theory and research in the 1990s. *Journal of Management, 25*, 293–315.

Arte, P., & Larimo, J. (2021). Moderating influence of product diversification on the international diversification-performance relationship: A meta-analysis. *Journal of Business Research*.

Atasoy, B. S. (2021). The determinants of export sophistication: Does digitalization matter? *International Journal of Finance & Economics, 26*(4), 5135–5159.

Auboin, M., Koopman, R., & Xu, A. (2021). Trade and innovation policies: Coexistence and spillovers. *Journal of Policy Modeling, 43*(4), 844–872.

Autio, E., Mudambi, R., & Yoo, Y. (2021). Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces. *Global Strategy Journal, 11*(1), 3–16.

Banalieva, E. R., & Dhanaraj, C. (2019). Internalization theory for the digital economy. *Journal of International Business Studies, 50*(8), 1372–1387.

Barker, V. L., III, & Duhaime, I. M. (1997). Strategic change in the turnaround process: Theory and empirical evidence. *Strategic Management Journal, 18*(1), 13–38.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120.

Barr, P. S., Stimpert, J. L., & Huff, A. S. (1992). Cognitive change, strategic action, and organizational renewal. *Strategic Management Journal, 13*, 15–36. https://doi.org/10.1002/smj.4250131004

Becker, B., Driffield, N., Lancheros, S., & Love, J. H. (2020). FDI in hot labour markets: The implications of the war for talent. *Journal of International Business Policy, 3*(2), 107–133.

Beckmann, J., & Czudaj, R. (2017). Capital flows and GDP in emerging economies and the role of global spillovers. *Journal of Economic Behavior & Organization, 142*, 140–163.

Bejlegaard, M., Sarivan, I. M., & Waehrens, B. V. (2021). The influence of digital technologies on supply chain coordination strategies. *Journal of Global Operations and Strategic Sourcing, 14*(4), 636–658. https://doi.org/10.1108/JGOSS-11-2019-0063

Bergamaschi, M., Bettinelli, C., Lissana, E., & Picone, P. M. (2021). Past, ongoing, and future debate on the interplay between internationalization and digitalization. *Journal of Management and Governance, 25*, 983–1032.

Bhandari, K. R., Rana, S., Paul, J., & Salo, J. (2020). Relative exploration and firm performance: Why resource-theory alone is not sufficient? *Journal of Business Research, 118*, 363–377.

Bird, S., Klein, E., & Loper, E. (2009). Natural language processing with Python: Analyzing text with the natural language toolkit. O'Reilly Media.

Birkinshaw, J. (2022). Move fast and break things: Reassessing IB research in the light of the digital revolution. *Global Strategy Journal*. https://doi.org/10.1002/gsj.1427

Björkdahl, J. (2020). Strategies for digitalization in manufacturing firms. *California Management Review, 62*(4), 17–36.

Blundell, R., & Bond, S. (2000). GMM estimation with persistent panel data: An application to production functions. *Econometric Reviews, 19*, 321–340.

Bojnec, Š., & Fertö, I. (2009). Impact of the internet on manufacturing trade. *Journal of Computer Information Systems, 50*(1), 124–132.

Boly, A., Coulibaly, S., & Kéré, E.N. (2019). *Tax policy, foreign direct investment and spillover effects*. African Development Bank.

Bouwman, H., Houtum, H., Janssen, M., & Versteeg, G. (2011). Business architectures in the public sector: Experiences from practice. *Communications of the Association for Information Systems, 29*, 411–26.

Bowen, H. P. (2007). The empirics of multinationality and performance. In A. Rugman (Ed.), *Regional aspects of multinationality and performance* (pp. 113–142). Emerald Group Publishing.

Brown, L. D., & Caylor, M. L. (2006). Corporate governance and firm valuation. *Journal of Accounting and Public Policy, 25*(4), 409–434.

Brynjolfsson, E., & Mitchell, T. (2017). What can machine learning do? Workforce implications. *Science, 358*(6370), 1530–1534.

Buckley, P., & Strange, R. (2015). The governance of the global factory: Location and control of world economic activity. *Academy of Management Perspectives, 29*(2), 237–249.

Burlea-Schiopoiu, A., Brostescu, S., & Popescu, L. (2021). The impact of foreign direct investment on the economic development of emerging countries of the European Union. *International Journal of Finance & Economics*. https://doi.org/10.1002/ijfe.2530

Capkun, V., Hameri, A. P., & Weiss, L. A. (2009). On the relationship between inventory and financial performance in manufacturing companies. *International Journal of Operations & Production Management, 29*(8), 789–806.

Cappa, F., Oriani, R., Peruffo, E., & McCarthy, I. (2021). Big data for creating and capturing value in the digitalized environment: Unpacking the effects of volume, variety, and veracity on firm performance. *Journal of Product Innovation Management, 38*(1), 49–67.

Caputo, F., Cillo, V., Candelo, E., & Liu, Y. (2019). Innovating through digital revolution: The role of soft skills and Big Data in increasing firm performance. *Management Decision, 57*(8).

Carlson, K. D., & Wu, J. (2012). The illusion of statistical control: Control variable practice in management research. *Organizational Research Methods, 15*(3), 413–435.

Carlsson, C. (2018). Decision analytics—Key to digitalization. *Information Sciences, 460*, 424–438.

Carnes, C. M., Hitt, M. A., Sirmon, D. G., Chirico, F., & Huh, D. W. (2021). Leveraging resources for innovation: The role of synchronization. *Journal of Product Innovation Management*. https://doi.org/10.1111/jpim.12606

Casella, B., & Formenti, L. (2018). FDI in the digital economy: A shift to asset-light international footprints. UNCTAD.

Chang, S. J., & Xu, D. (2008). Spillovers and competition among foreign and local firms in China. *Strategic Management Journal, 29*(5), 495–518.

Chen, H., & Hsu, C. W. (2010). Internationalization, resource allocation and firm performance. *Industrial Marketing Management, 39*(7), 1103–1110.

Chen, H., & Tian, Z. (2022). Environmental uncertainty, resource orchestration and digital transformation: A fuzzy-set QCA approach. *Journal of Business Research, 139*, 184–193.

Cho, J., DeStefano, T., Kim, H., Kim, I., & Paik, J. H. (2022). What's driving the diffusion of next-generation digital technologies? *Technovation, Article*, Article 102477.

Cho, S. H., & Kim, H. G. (2017). Intellectual property rights protection and technological innovation: The moderating effect of internationalization. *Multinational Business Review, 25*(4), 350–368.

Contractor, F. J. (2021). A decline in US manufacturing because of globalization and China? Don't believe this fake news. *Management and Organization Review, 17*(1), 16–23.

Cortellazzo, L., Bruni, E., & Zampieri, R. (2019). The role of leadership in a digitalized world: A review. *Frontiers in Psychology, 10*, 1938. https://doi.org/10.3389/fpsyg.2019.01938

Covin, J. G., & Wales, W. J. (2019). Crafting high-impact entrepreneurial orientation research: Some suggested guidelines. *Entrepreneurship: Theory and Practice, 43*(1), 3–18. https://doi.org/10.1177/1042258718773181

Dąbrowska, J., Almpanopoulou, A., Brem, A., Chesbrough, H., Cucino, V., Di Minin, A., Giones, F., Hakala, H., Marullo, C., Mention, A.-L., Mortara, L., Nørskov, S., Nylund, P. A., Oddo, C. M., Radziwon, A., & Ritala, P. (2022). Digital transformation, for better or worse: A critical multi-level research agenda. *R&D Management*. https://doi.org/10.1111/radm.12531

Dachs, B., Kinkel, S., & Jäger, A. (2019). Bringing it all back home? Backshoring of manufacturing activities and the adoption of Industry 4.0 technologies. *Journal of World Business, 54*(6), Article 101017 (Article).

Deng, Z., Liesch, P. W., & Wang, Z. (2021). Deceptive signaling on globalized digital platforms: Institutional hypnosis and firm internationalization. *Journal of International Business Studies*, 1–25.

Deng, Z., Zhu, Z., Johanson, M., & Hilmersson, M. (2021). Rapid internationalization and exit of exporters: The role of digital platforms. *International Business Review, Article*, Article 101896.

Denicolai, S., Zucchella, A., & Magnani, G. (2021). Internationalization, digitalization, and sustainability: Are SMEs ready? A survey on synergies and substituting effects among growth paths. *Technological Forecasting and Social Change, 166*, Article 120650 (Article).

Dougherty, D., & Dunne, D. D. (2012). Digital science and knowledge boundaries in complex innovation. *Organization Science, 23*(5), 1467–1484.

Du, J., Zhu, S., & Li, W. H. (2022). Innovation through internationalization: A systematic review and research agenda. *Asia Pacific Journal of Management*, 1–35.

Dunning, J. H. (1981). *International production and the multinational enterprise*. Allen & Unwin.

Duriau, V. J., Reger, R. K., & Pfarrer, M. D. (2007). A content analysis of the content analysis literature in organization studies. *Organizational Research Methods, 10*(1), 5–34. https://doi.org/10.1177/1094428106289252
Eapen, A. (2012). Social structure and technology spillovers from foreign to domestic firms. *Journal of International Business Studies, 43*(3), 244–263.
Eckert, S., Dittfeld, M., Muche, T., & Rässler, S. (2010). Does multinationality lead to value enhancement? An empirical examination of publicly listed corporations from Germany. *International Business Review, 19*(6), 562–574.
Elbanna, A., & Newman, M. (2022). The bright side and the dark side of top management support in digital transformation–A hermeneutical reading. *Technological Forecasting and Social Change, 175*, Article 121411 (Article).
Elia, S., Giuffrida, M., Mariani, M. M., & Bresciani, S. (2021). Resources and digital export: An RBV perspective on the role of digital technologies and capabilities in cross-border e-commerce. *Journal of Business Research, 132*, 158–169.
Ferreira, J. J., Fernandes, C. I., & Ferreira, F. A. (2019). To be or not to be digital, that is the question: Firm innovation and performance. *Journal of Business Research, 101*, 583–590.
Ghauri, P., Strange, R., & Cooke, F. L. (2021). Research on international business: The new realities. *International Business Review, 30*(2), Article 101794 (Article).
Girma, S. (2005). Absorptive capacity and productivity spillovers from FDI: A threshold regression analysis. *Oxford Bulletin of Economics and Statistics, 67*(3), 281–306.
Gomes-Casseres, B., Jenkins, M., & Zámborský, P. (2019). Profitability of joint ventures abroad: Explaining a new empirical puzzle. In F. J. Contractor, & J. J. Reuer (Eds.), *Frontiers of strategic alliance research: Negotiating, structuring and governing partnerships* (pp. 322–336). Cambridge University Press.
Gulati, R. (1999). Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal, 20*(5), 397–420.
Haans, R. F., Pieters, C., & He, Z. L. (2016). Thinking about U: Theorizing and testing U- and inverted U-shaped relationships in strategy research. *Strategic Management Journal, 37*(7), 1177–1195.
Hanelt, A., Bohnsack, R., Marz, D., & Antunes Marante, C. (2021). A systematic review of the literature on digital transformation: insights and implications for strategy and organizational change. *Journal of Management Studies, 58*(5), 1159–1197.
Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, 1029–1054.
Hillemann, J., & Gestrin, M. (2016). The limits of firm-level globalization: Revisiting the FSA/CSA matrix. *International Business Review, 25*(3), 767–775.
Holmström, J. (2018). Recombination in digital innovation: Challenges, opportunities, and the importance of a theoretical framework. *Information and Organization, 28*(2), 107–110.
Ingršt, I., & Zámborský, P. (2021). Knowledge flows, strategic motives and innovation performance: Insights from Australian and New Zealand investment in Europe. *Journal of Management & Organization, 27*(5), 948–971.
Jacobs, E. J., Zámborský, P., & Sbai, E. (2017). Mutual productivity spillovers in Slovakia: Absorptive capacity, the technology gap, and nonlinear effects. *Eastern European Economics, 55*(4), 291–323.
Jaiswal, A., Arun, C. J., & Varma, A. (2021). Rebooting employees: upskilling for artificial intelligence in multinational corporations. *The International Journal of Human Resource Management*, 1–30.
Jankowska, B., Götz, M., & Tarka, P. (2021). Foreign subsidiaries as vehicles of Industry 4.0: The case of foreign subsidiaries in a post-transition economy. *International Business Review, Article*, Article 101886.
Javorcik, B. S. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *American Economic Review, 94*(3), 605–627.
Juergensen, J. J., Narula, R., & Surdu, I. (2021). A systematic review of the relationship between international diversification and innovation: A firm-level perspective. *International Business Review*. https://doi.org/10.1016/j.ibusrev.2021.101955
Keller, W., & Yeaple, S. R. (2009). Multinational enterprises, international trade, and productivity growth: Firm-level evidence from the United States. *The Review of Economics and Statistics, 91*(4), 821–831.
Kim, D., Cavusgil, S. T., & Calantone, R. J. (2005). The role of information technology in supply-chain relationships: does partner criticality matter? *Journal of Business & Industrial Marketing, 20*(4/5), 169–178.
Kindermann, B., Beutel, S., de Lomana, G. G., Strese, S., Bendig, D., & Brettel, M. (2021). Digital orientation: Conceptualization and operationalization of a new strategic orientation. *European Management Journal, 39*(5), 645–657.
Kogut, B., & Zander, U. (1993). Knowledge of the firm and the evolutionary theory of the multinational corporation. *Journal of International Business Studies, 24*(4), 625–645.
Kohli, R., & Grover, V. (2008). Business value of IT: An essay on expanding research directions to keep up with the times. *Journal of the Association for Information Systems, 9*(1), 23–39.
Kohtamäki, M., Parida, V., Patel, P. C., & Gebauer, H. (2020). The relationship between digitalization and servitization: The role of servitization in capturing the financial potential of digitalization. *Technological Forecasting and Social Change, 151*, Article 119804.
Kosová, R. (2010). Do foreign firms crowd out domestic firms? Evidence from the Czech Republic. *The Review of Economics and Statistics, 92*(4), 861–881.
Kristoffersen, E., Mikalef, P., Blomsma, F., & Li, J. (2021). The effects of business analytics capability on circular economy implementation, resource orchestration, capability and firm performance. *International Journal of Production Economics*, Article 108205 (Article).
Landauer, T. K. (1995). *The trouble with computers: Usefulness, usability, and productivity*. MIT press,.
Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics, 33*, 159–174.
Lanzolla, G., Pesce, D., & Tucci, C. L. (2021). The digital transformation of search and recombination in the innovation function: Tensions and an integrative framework. *Journal of Product Innovation Management, 38*(1), 90–113.
Lavie, D. (2006). The competitive advantage of interconnected firms: An extension of the resource-based view. *Academy of Management Review, 31*(3), 638–658.
Lee, C. L., & Wu, H. C. (2016). How do slack resources affect the relationship between R&D expenditures and firm performance? *R&D Management, 46*(S3), 958–978.
Lee, I. H., & Rugman, A. M. (2012). Firm-specific advantages, inward FDI origins, and performance of multinational enterprises. *Journal of International Management, 18*(2), 132–146.
Lee, J. Y., Jiménez, A., & Bhandari, K. R. (2020). Subsidiary roles and dual knowledge flows between MNE subsidiaries and headquarters: The moderating effects of organizational governance types. *Journal of Business Research, 108*, 188–200.
Lepore, D., Dubbini, S., Micozzi, A., & Spigarelli, F. (2022). Knowledge sharing opportunities for Industry 4.0 firms. *Journal of the Knowledge Economy, 13*(1), 501–520.
Li, H., Yi, X., & Cui, G. (2017). Emerging market firms' internationalization: How do firms' inward activities affect their outward activities? *Strategic Management Journal, 38*(13), 2704–2725.
Li, J., Li, Y., & Shapiro, D. (2012). Knowledge seeking and outward FDI of emerging market firms: The moderating effect of inward FDI. *Global Strategy. Journal, 2*(4), 277–295.
Li, L. (2022). Digital transformation and sustainable performance: The moderating role of market turbulence. *Industrial Marketing Management, 104*, 28–37.
Liu, Y., & Xi, M. (2021). Linking CEO entrepreneurial orientation to firm performance: the perspective of middle managers' cognition. *Entrepreneurship Theory and Practice*,
Lu, J. W., & Beamish, P. W. (2004). International diversification and firm performance: The S-curve hypothesis. *Academy of Management Journal, 47*(4), 598–609.
Lu, J. W., Ma, H., & Xie, X. (2021). Foreignness research in international business: Major streams and future directions. *Journal of International Business Studies*, 1–32.
Luo, Y. (2021). New OLI advantages in digital globalization. *International Business Review, 30(2), Article*, Article 101797.
Luo, Y. (2022a). A general framework of digitization risks in international business. *Journal of International Business Studies, 53*, 344–361.
Luo, Y. (2022b). New connectivity in the fragmented world. *Journal of International Business Studies, 53*, 1–19.
Luo, Y., & Witt, M. A. (2022). Springboard MNEs under de-globalization. *Journal of International Business Studies, 53*, 767–780.
Mabey, C., & Zhao, S. (2017). Managing five paradoxes of knowledge exchange in networked organizations: New priorities for HRM? *Human Resource Management Journal, 27*(1), 39–57.
Marano, V., Tallman, S., & Teegen, H. J. (2020). The liability of disruption. *Global Strategy. Journal, 10*(1), 174–209.
Martínez-Caro, E., Cegarra-Navarro, J. G., & Alfonso-Ruiz, F. J. (2020). Digital technologies and firm performance: The role of digital organisational culture. *Technological Forecasting and Social Change, 154*, Article 119962 (Article).
McKenny, A. F., Aguinis, H., Short, J. C., & Anglin, A. H. (2018). What doesn't get measured does exist: Improving the accuracy of computer-aided text analysis. *Journal of Management, 44*(7), 2909–2933. https://doi.org/10.1177%2F0149206316657594.
McKinsey & Company. (2019). Digital transformation: Improving the odds of success. https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/digital-transformation-improving-the-odds-of-success.
McKinsey & Company. (2021). Building a more competitive US manufacturing sector. https://www.mckinsey.com/featured-insights/americas/building-a-more-competitive-us-manufacturing-sector.
Mees-Buss, J., Welch, C., & Westney, D. E. (2019). What happened to the transnational? The emergence of the neo-global corporation. *Journal of International Business Studies, 50*(9), 1513–1543.
Mellahi, K., Meyer, K., Narula, R., Surdu, I., & Verbeke, A. (2021). The Oxford handbook of international business strategy. *Oxford University Press*. https://doi.org/10.1057/s41267-021-00461-y
Meyer, K. E., Mudambi, R., & Narula, R. (2011). Multinational enterprises and local contexts: The opportunities and challenges of multiple embeddedness. *Journal of Management Studies, 48*(2), 235–252.
Meyer, K. E., & Sinani, E. (2009). When and where does foreign direct investment generate positive spillovers? A meta-analysis. *Journal of International Business Studies, 40*(7), 1075–1094.
Mithas, S., & Rust, R. T. (2016). How information technology strategy and investments influence firm performance. *MIS Quarterly, 40*(1), 223–246.
Mizik, N., & Jacobson, R. (2003). Trading off between value creation and value appropriation: The financial implications of shifts in strategic emphasis. *Journal of Marketing, 67*(1), 63–76.
Morgan-Thomas, A., Dessart, L., & Veloutsou, C. (2020). Digital ecosystem and consumer engagement: A socio-technical perspective. *Journal of Business Research*, 1–44. https://doi.org/10.1016/j.jbusres.2020.03.042
Mudambi, R., & Swift, T. (2011). Leveraging knowledge and competencies across space: The next frontier in international business. *Journal of International Management, 17*(3), 186–189.
Nag, R., Hambrick, D. C., & Chen, M. J. (2007). What is strategic management, really? Inductive derivation of a consensus definition of the field. *Strategic Management Journal, 28*(9), 935–955.
Nambisan, S., & Luo, Y. (2022). *The digital multinational: Navigating the new normal in global business*. MIT Press,.

Nenonen, S., Storbacka, K., & Windahl, C. (2019). Capabilities for market-shaping: Triggering and facilitating increased value creation. *Journal of the Academy of Marketing Science, 47*(4), 617–639.
Newell, S., Scarbrough, H., & Swan, J. (2001). From global knowledge management to internal electronic fences: Contradictory outcomes of intranet development. *British Journal of Management, 12*(2), 97–111.
Nograšek, J. (2011). Change management as a critical success factor in e-government implementation. *Business Systems Research: International Journal of the Society for Advancing Innovation and Research in Economy, 2*(2), 13–24.
Olavarrieta, S., & Friedmann, R. (2008). Market orientation, knowledge-related resources and firm performance. *Journal of Business Research, 61*(6), 623–630.
Orlic, E., Hashi, I., & Hisarciklilar, M. (2018). Cross sectoral FDI spillovers and their impact on manufacturing productivity. *International Business Review, 27*(4), 777–796.
Palliam, R. (2006). Further evidence on the information content of economic value added. *Review of Accounting & Finance, 5*(3), 204–215.
Perks, H., Kowalkowski, C., Witell, L., & Gustafsson, A. (2017). Network orchestration for value platform development. *Industrial Marketing Management, 67*, 106–121.
Perri, A., & Peruffo, E. (2016). Knowledge spillovers from FDI: A critical review from the international business perspective. *International Journal of Management Reviews, 18*(1), 3–27.
Pitelis, C. N., & Teece, D. J. (2018). The new MNE: 'Orchestration' theory as envelope of 'internalisation' theory. *Management International Review, 58*(4), 523–539.
Proeger, T., & Runst, P. (2020). Digitization and knowledge spillover effectiveness—Evidence from the "German Mittelstand.". *Journal of the Knowledge Economy, 11*(4), 1509–1528.
Ran, W., Wang, Y., Yang, L., & Liu, S. (2020). Coordination mechanism of supply chain considering the bullwhip effect under digital technologies. *Mathematical Problems in Engineering*. https://doi.org/10.1155/2020/3217927
Ricci, F., Scafarto, V., Ferri, S., & Tron, A. (2020). Value relevance of digitalization: The moderating role of corporate sustainability. An empirical study of Italian listed companies. *Journal of Cleaner Production, 276*, Article 123282 (Article).
Rosa, B., Gugler, P., & Verbeke, A. (2020). Regional and global strategies of MNEs: revisiting Rugman & Verbeke (2004). *Journal of International Business Studies, 51*, 1045–1053.
Rossum, G. (1995). Python reference manual.
Ruiz-Alba, J. L., Guesalaga, R., Ayestarán, R., & Mediano, J. M. (2020). Interfunctional coordination: The role of digitalization. *Journal of Business & Industrial Marketing, 35*(3), 404–419.
Rüling, C. C., & Duymedjian, R. (2014). Digital bricolage: Resources and coordination in the production of digital visual effects. *Technological Forecasting and Social Change, 83*, 98–110.
Schildt, H. (2017). Big data and organizational design–The brave new world of algorithmic management and computer augmented transparency. *Innovation: Management, Policy and Practice, 19*(1), 23–30.
Schwens, C., Zapkau, F. B., Bierwerth, M., Isidor, R., Knight, G., & Kabst, R. (2018). International entrepreneurship: A meta–analysis on the internationalization and performance relationship. *Entrepreneurship Theory and Practice, 42*(5), 734–768.
Scott-Kennel, J., & Saittakari, I. (2020). Sourcing or sharing in MNE networks? National headquarters and foreign subsidiaries as knowledge conduits in SMOPECs. *International Business Review, 29*(1), Article 101622.
Shaheer, N. A., & Li, S. (2020). The CAGE around cyberspace? How digital innovations internationalize in a virtual world. *Journal of Business Venturing, 35*(1), Article 105892.
Short, J. C., Broberg, J. C., Cogliser, C. C., & Brigham, K. H. (2010). Construct validation using computer-aided text analysis (CATA): An illustration using entrepreneurial orientation. *Organizational Research Methods, 13*(2), 320–347. https://doi.org/10.1177/1094428109335949
Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing firm resources in dynamic environments to create value: Looking inside the black box. *Academy of Management Review, 32*(1), 273–292.
Sirmon, D. G., Hitt, M. A., Ireland, R. D., & Gilbert, B. A. (2011). Resource orchestration to create competitive advantage: Breadth, depth, and life cycle effects. *Journal of Management, 37*(5), 1390–1412.
Smith, C. G., & Smith, J. B. (2021). Founders' uses of digital networks for resource acquisition: Extending network theory online. *Journal of Business Research, 125*, 466–482.
Srinivasan, R. (2021). *Platform business models: Frameworks, concepts and design*. Springer,.
Stoyanov, S., Woodward, R., & Stoyanova, V. (2018). Simple word of mouth or complex resource orchestration for overcoming liabilities of outsidership. *Journal of Management, 44*(8), 3151–3175.
Tetlock, P. C., Saar-Tsechansky, M., & Macskassy, S. (2008). More than words: Quantifying language to measure firms' fundamentals. *The Journal of Finance, 63*(3), 1437–1467. https://doi.org/10.1111/j.1540-6261.2008.01362.x
Trittin-Ulbrich, H., Scherer, A. G., Munro, I., & Whelan, G. (2021). Exploring the dark and unexpected sides of digitalization: Toward a critical agenda. *Organization, 28*(1), 8–25.
Tsou, H. T., & Chen, J. S. (2021). How does digital technology usage benefit firm performance? Digital transformation strategy and organisational innovation as mediators. *Technology Analysis & Strategic Management*, 1–14.
Turel, O., Qahri-Saremi, H., & Vaghefi, I. (2021). Dark sides of digitalization. *International Journal of Electronic Commerce, 25*(2), 127–135.
Usai, A., Fiano, F., Messeni Petruzzelli, A., Paoloni, P., Farina Briamonte, M., & Orlando, B. (2021). Unveiling the impact of the adoption of digital technologies on firms' innovation performance. *Journal of Business Research, 133*, 327–336.
Verbeke, A., & Hutzschenreuter, T. (2021). The dark side of digital globalization. *Academy of Management Perspectives, 35*(4), 606–621.
Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. *Journal of Business Research, 122*, 889–901.
Volberda, H. W., Khanagha, S., Baden-Fuller, C., Mihalache, O. R., & Birkinshaw, J. (2021). Strategizing in a digital world: Overcoming cognitive barriers, reconfiguring routines and introducing new organizational forms. *Longest Range Planning, 54*(5), Article 102110 (Article).
Wang, H., Feng, J., Zhang, H., & Li, X. (2020). The effect of digital transformation strategy on performance: The moderating role of cognitive conflict. *International Journal of Conflict Management, 31*(3).
Wang, J., Xue, Y., & Yang, J. (2020). Boundary-spanning search and firms' green innovation: the moderating role of resource orchestration capability. *Business Strategy and the Environment, 29*, 361–374.
Woolridge, J. M. (2009). *Introductory Econometrics: A Modern Approach*. Canada: South Western,.
Xie, Z., Wang, J., & Miao, L. (2021). Big data and emerging market firms' innovation in an open economy: The diversification strategy perspective. *Technological Forecasting and Social Change, 173*, Article 121091.
Yoo, Y., Henfridsson, O., & Lyytinen, K. (2010). The new organizing logic of digital innovation: An agenda for information systems research. *Information Systems Research, 21*(4), 724–735.
Zámborský, P. (2021). A blueprint for succeeding despite uncertain global markets. *Journal of Business Strategy, 42*(3), 168–176.
Zeng, J., Tavalaei, M. M., & Khan, Z. (2021). Sharing economy platform firms and their resource orchestration approaches. *Journal of Business Research, 136*, 451–465.
Zhai, H., Yang, M., & Chan, K. C. (2022). Does digital transformation enhance a firm's performance? Evidence from China. *Technology in Society, 68*, Article 101841 (Article).