HOW AND WHEN DOES DIGITALIZATION INFLUENCE EXPORT PERFORMANCE? A META-ANALYSIS OF ITS CONSEQUENCES AND CONTINGENCIES

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Abstract

Purpose – This study aims to clarify the direct impact of digitalization on export performance (EP) by synthesizing previous research and testing this relationship empirically. Furthermore, the study investigates digitalization types, contextual moderators, and method moderators affecting the impact of digitalization on EP.

Design/methodology/approach – The study uses meta-analysis to test the digitalization–EP relationship (k=81) using data from 106 independent samples involving 62,082 respondents across nearly 30 countries.

Findings – The study finds digitalization's positive and significant effect on EP (r=0.36). The impact of digitalization on EP is also subject to different moderators, including digitalization type (i.e., digital capabilities), contextual factors (i.e., institutions, export experience, development of the region, and industry), and method factors (i.e., back translation and strategy measurement)

Originality/value – Scholars have initiated studies on the impacts of diverse digitalization types on EP, while empirical findings on these effects remain inconclusive. Based on resource-based theory, the study develops and validates a comprehensive meta-analytic framework, revealing the important influence of digitalization on EP. The moderator findings further highlight the impact of internal and external contingencies on the outcomes of exporting firms' digitalization.

Keywords Export performance, Resource-based theory, Digitalization, Institutional factors, Meta-analysis.

Paper type Research paper

1. Introduction

As the most popular way for firms to engage internationally, exporting is crucial for the global economy, accounting for 26% of the world's gross domestic product (GDP; World Bank, 2022). In recent years, digitalization, namely the process of continuously integrating digital technologies and resources into firms' practices (Firk *et al.*, 2021; Hanelt *et al.*, 2020), is fundamentally altering exporting firms' business models and providing assistance in targeting and serving distant customers (Brouthers *et al.*, 2022; Katsikeas *et al.*, 2020; Meyer *et al.*, 2023).[1] It amplifies firms' capabilities in dealing with high levels of information asymmetry, which are particularly challenging in competing in international markets (Jean *et al.*, 2021). Despite the potential benefits, many managers remain unsure whether to facilitate their firms' digitalization and when their digitalization efforts yield measurable export performance (EP) outcomes (Wang, 2020).

Extant exporting reviews have revealed various determinants of EP, with some emphasizing export marketing strategy as a mechanism that leverages competitive advantage for superior EP (Chen *et al.*, 2016).[2] So far, the role of digitalization has not been explicitly included in the traditional EP framework as an independent construct, with internet marketing activities (termed "digital strategy" in this study; Moon and Jain, 2007), for instance, only implicitly categorized as an export marketing strategy in the previous EP review (Chen *et al.*, 2016). More recent studies have examined the effect of digitalization on EP, using diverse terminologies such as social media and e-commerce resources/capabilities (Gregory *et al.*, 2019; Mahmoud *et al.*, 2020). This diversity and the emerging significance of these technologies in exporting highlight a need to clarify terminologies used in research and to

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[1] It is important to note the impact of digitalization extends beyond EP. For a broader conceptual review on the impacts of digitalization across various dimensions of firm performance, please refer to Hanelt *et al*. (2020), and Meyer *et al*. (2023).

[2] Appendices about these studies are available as online supplemental material. An overview of EP and digitalization reviews is shown in Web Appendix A.

comprehensively explore their impacts on EP. Here, we categorize these terminologies under the overarching concept of digitalization. Resource-based theory (RBT) posits that the value derived from structuring firm resources, bundling capabilities, and leveraging strategy can provide competitive advantages crucial for superior performance (Barney, 1991; D'Oria *et al.,* 2021). Digitalization, as a multifaceted construct, can be dissected into three primary types: digital resources, capabilities, and strategy. *Digital resources,* such as internet-based investment and infrastructure, are at the owning stage and coordinated within existing firm capabilities to enable exporting firms to leverage new capabilities for reshaping their exporting activities (Tolstoy *et al.*, 2021) and bridge institutional gaps (Jean and Kim, 2021). Furthermore, *digital capabilities* refer to a firm's ability to structure and bundle digital resources to achieve a desired end. *Digital strategy* is a firm's digital activities to leverage resources and capabilities to achieve its objectives (Elia *et al.*, 2021; Hanelt *et al.*, 2020). Guided by RBT, we propose digitalization as a novel determinant of EP (Bianchi and Mathews, 2016; Gregory *et al.*, 2019; Wang, 2020).

There are two main shortcomings in the digitalization–EP literature that the study aims to address. First, there is no unified theoretical guidance on whether the digitalization construct relates to EP. In the past, researchers have followed various RBT streams proposing different types of digitalization (D'Oria *et al.*, 2021), leading to varied impacts on EP. For instance, the possession of digital resources, has shown mixed effects on EP, with some studies indicating positive outcomes (Pergelova *et al.*, 2019; Wang, 2020) and others finding insignificant impacts (Lecerf and Omrani, 2020). Findings on digital capabilities and strategy also remain inconsistent in the literature, ranging from positive effects of digital capabilities (Wang, 2020) to weak or negative effects of strategy (Eid *et al.*, 2020; Morgan-Thomas and Bridgewater, 2004) on EP. These inconsistent findings may be due to the proliferation of

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varied terminologies; the inconsistency indicates a lack of a standardized, comprehensive map covering the digitalization construct and describing its impact on EP.

Second, research has overlooked essential boundary conditions for the digitalization–EP link. There has been insufficient examination of digitalization types as moderators. Based on RBT, digital resources, capabilities, and strategy represent different stages of resource deployment and application. Testing these moderators is crucial in understanding which type of digitalization most effectively enhances EP, thus explaining the heterogeneity in previous studies. Moreover, although some studies have considered moderators such as firm size and experience (Mahmoud *et al.*, 2020), industry differences (Gnizy, 2019), and institutional distance (Jean and Kim, 2021), there has been a lack of systematic assessments of various internal (firm-level) and external (regional, institutional, and industrial levels) contextual factors. Notably, institutional factors (including regulations, norms, and cognitions) have been largely overlooked (Peng *et al.*, 2008; Scott, 1995). This omission is a significant constraint on the validity of prior research findings, given the important role of institutions in shaping a firm's decisions and performance, particularly in the exporting context (Peng *et al.*, 2008). Since most studies are survey-based and focused on a single country or industry, they tend to provide limited generalizability.

Hence, the literature leaves serious questions unanswered: Whether and how does digitalization impact EP? The objective of this study is to test the relationship between digitalization and EP through a meta-analysis to combine and compare findings across multiple contexts (D'Oria *et al.*, 2021). Our meta-analysis synthesizes the empirical results of research on digitalization in exporting, encompassing 106 independent samples from 99 studies involving 62,082 respondents. The technique also allows us to examine certain moderators that could be viewed as boundary conditions of the main effect (Blut *et al.*, 2023; Tan and Sousa, 2015). We make two contributions to the digitalization and EP literature.

First, the study clarifies the use of digital terminologies in previous literature in connection with digitalization and derives a complete theoretical framework to directly assess the impact of digitalization on EP. Based on RBT, the digitalization–EP link includes correlations of diverse digitalization types, including digital resources, capabilities, and strategy on EP (Moon and Jain, 2007; Mahmoud *et al.*, 2020).[3] As our study shows, scholars in this field should recognize digitalization as a dominant determinant of EP, given its strong direct effect; it also guides exporters in prioritizing their efforts when engaging in digitalization.

Second, this study adds to digitalization–EP research by considering a wide range of moderators. The study compares different impacts of digitalization types on EP and suggests digital capabilities are more influential; it demonstrates the potential of digital capabilities that resources are effectively bundled within organizations (D'Oria *et al.*, 2021). Moreover, firms' digitalization cannot act in a vacuum and is not isolated from complex contexts (Jean *et al.*, 2021). It is necessary to combine RBT with a contingency perspective to reflect the fact that the digitalization–EP effect is conditional upon a number of firm-level and environmental contexts (Chen *et al.*, 2016; D'Oria *et al.*, 2021; Kim and Ployhart, 2018). In this connection, our study is among the first to provide empirical insights into the impact of institutions based on nearly 30 countries on the outcomes of exporting firms' digitalization. Understanding institutional factors and their impact on business has become a front-and-center task for exporting firms (Chen *et al.*, 2016; He *et al.*, 2013). Overall, our moderator assessments, including digitalization types, contextual moderators, and method moderators, help establish a better perspective on the conditions under which digitalization enhances EP, informing export managers of when to expect positive outcomes from their digitalization efforts.

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[3] Our primary focus is on the relationship between digitalization and EP. However, we acknowledge that digital resources, capabilities, and strategy are interlinked; this study does not delve deeply into these interconnections. For a detailed discussion on their interconnections, please refer to D'Oria et al. (2021).

2. Literature review and meta-analytic framework

In line with previous EP reviews (Chen *et al.*, 2016), the effect of digitalization and its types can be theoretically explained using RBT. Three branches of RBT are particularly relevant to understanding the digitalization–EP literature. First, traditional RBT (Barney, 1991) regards organizational resources as something to be exploited according to opportunities in the marketplace. Hence, performance can be explained as the outcome of the possession of digital resources, with firm strategy featuring more implicitly as a route to value creation (Barney *et al.*, 2021). The dynamic capability view further emphasizes how firms integrate and reconfigure resources to adapt to rapidly changing technological environments (Eisenhardt and Martin, 2000). It emphasizes how firms develop dynamic capabilities by integrating, reconfiguring, gaining, and releasing resources to adapt to and even capitalize on rapidly changing technological environments. In this view, digital capabilities explain superior EP as they emphasize the strategic coordination and recombination of digital resources (Wang, 2020). The resource orchestration view sees possession of resources as a necessary condition; it is by structuring resources, bundling capabilities, and leveraging strategy that competitive advantage is unlocked (Sirmon *et al.*, 2007); hence, digital strategy leads to EP effectively. Overall, the three streams provide a solid foundation for the categorization and importance of digitalization in exporting.

Nevertheless, the literature is far from clear about digitalization's impact, as studies relying on different RBT streams or digitalization terminologies have generated inconsistent results (Web Appendix B provides details of existing findings). Researchers have focused on the positive role of digitalization on EP (Lal, 2004; Wang, 2020). However, a few studies uncovered a negative digitalization–EP relationship, e.g., negative effects of digital resources (platform experience; Kim *et al.*, 2021), digital capabilities (IT capabilities; Zhang *et al.*, 2008), and digital strategy (social media usage; Eid *et al.*, 2020) on EP. The inconsistency

may be partly due to the diverse foci and research designs adopted by these studies. Researchers have investigated multiple elements of digitalization, e.g., website and digital platform capabilities (Jean and Kim, 2020) and internet promotion and distribution activities (Moon and Jain, 2007) under the digitalization construct. As research in this crucial area grows, differences in terminology become more apparent. Notably, there's a clear lack of review that systematically clarifies the rationalization of all the terminologies used in connection with digitalization. This gap hinders a clear understanding of the digitalization–EP relationship. Based on RBT, we examine the overall direct effect of digitalization on EP. We further consider digitalization types as moderators because the development of RBT and its three streams imply that they contribute differently to EP. Figure 1 shows our meta-analytic framework. Table I presents these definitions and operations.

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Moreover, drawing on contingency theory as well as previous research, we include contextual factors as relevant to explaining the digitalization–EP relationship (Chen *et al.*, 2016; Kim and Ployhart, 2018). Contingency theory posits that variations in firms' outcomes of practices are explained by their efforts to match multiple levels of factors (Harrigan, 1983; Kim and Ployhart, 2018). We examine the commonly studied firm-level characteristics of export year, firm size, and firm age (Gnizy, 2019; Mathews *et al.*, 2016), and we consider digital technology type (third-party digital platforms vs. traditional digital tools) as studies have confirmed the influence of multiple digital technologies (Gnizy, 2019; Mahmoud *et al.*, 2020). External moderators have attracted less attention, and previous research has examined environmental factors only within single domestic or foreign markets (Wang, 2020). Here, we consider the roles of regional and industrial differences, as the digitalization effect may be unbalanced across these contingencies (Gnizy, 2019; Katsikeas *et al.*, 2019). We highlight institutional moderators for two reasons. First, there exists a research gap, with scant studies

exploring institutional factors, such as the distance between the home and international market, which could lead to variations in the effect of digitalization on EP (Jean and Kim, 2021). The scarcity of research in the literature underscores the challenges associated with collecting relevant information using survey instruments, while a meta-analysis offers a unified platform to assess institutions across nearly 30 countries from studies reporting their study location, thereby examining how institutions affect organizational behaviors (Peng *et al.*, 2008; Scott, 1995).

Second, institutional perspective suggests that three core pillars, i.e., regulative, normative, and cognitive institutions, influence firm behaviors and values generated from resource-based advantages, and hence understanding institutional factors can enrich our understanding of market heterogeneity within the digitalization–EP literature (Meyer *et al.*, 2023; Peng *et al.*, 2008). As in previous studies (He *et al.*, 2013; Kostova *et al.*, 2020), we test regulatory institutions, which comprise formal rules and laws ensuring stability and order in societies, influencing exporting firms' digitalization operation to comply with regulatory requirements. Normative institutions include social norms, values, and standards in society; they shape firms' behaviors and their acceptance of digitalization within the local norms. Cognitive institutions refer to shared social knowledge and beliefs that shape individual perceptions and actions within a society. We delve into a detailed examination of five of Hofstede's (2001) dimensions, which are the most used measures of institution and information system literature (Kostova *et al.*, 2020; Leidner and Kayworth, 2006). For instance, uncertainty avoidance was the most used dimension in investigating information technology adoption, as objectives and outcomes of digitalization are affected by national cultures (Leidner and Kayworth, 2006). Although concerns have been raised about the datedness of Hofstede's dimensions, other meta-analytic findings remain robust even when using alternative country-level scores (Rockstuhl *et al.*, 2020). This supports the ongoing

relevance and utility of Hofstede's measures. The cognitive institutions describe differences in social values and are multifaceted, requiring a more granular analysis. These assessments provide deeper insights into how each dimension interacts with digitalization and potentially influences EP (Kirca *et al.*, 2005; Leidner and Kayworth, 2006).

In line with our meta-analytic approach, we also include method moderators that could explain heterogeneous results (Blut *et al.*, 2023). Definitions and coding of moderators are shown in Table II.

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2.1 A main effect of the digitalization–EP link

Digitalization represents the investment and usage of digital technologies in business processes (Firk *et al.*, 2021; Hanelt *et al.*, 2020). Based on the RBT, digitalization significantly impacts EP as it enables firms to leverage their digital resources effectively, enrich existing firm capabilities, and achieve strategy efficiency (Gregory *et al.*, 2019; Moon and Jain, 2007). We hypothesize that firms' digitalization efforts improve EP. First, exporters can gain foreign market insights and competitor information through investing and using internet-based technologies, such as social media and e-commerce (Gregory *et al.*, 2019; Moon and Jain, 2007). Such information gained through digitalization contributes to unparalleled advantages and better performance. Second, exporting firms can rapidly identify and engage new customers, suppliers, and partners globally, increasing international market sales alongside a reduction in operational costs (Mathews *et al.*, 2016; Sinkovics *et al.*, 2013). Digitalization also fosters better relationships in an enhanced communication process, further boosting EP (Mahmoud *et al.*, 2020). Hence, we propose:

H1. Digitalization of exporting firms is positively related to EP.

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2.2 Digitalization types as moderators of the digitalization–EP relationships

Digital resources, capabilities, and strategy, while all belonging to digitalization, may vary in their impacts on EP. ***Digital resources*** represent tangible (e.g., digital infrastructures) and intangible (e.g., website age) digital assets and abilities available within a firm (Barney *et al*., 2021; Gregory *et al*., 2019). They provide the essential assets needed for further objectives; their full potential is realized when effectively utilized (Barney, 2021; Gregory *et al*., 2019).

    Digital capabilities reflect the firm's proficiency in utilizing digital resources (Gregory *et al.*, 2019; Kim and Cavusgil, 2020; Mathews *et al.*, 2016; Wang, 2020). They are inclusive of what has previously been labeled as "digital marketing capabilities," "internet marketing capabilities," and "e-commerce capabilities" in the literature (Elia *et al.*, 2021; Liu *et al.*, 2020; Wang, 2020). Based on a dynamic capability approach, most studies have described that digital capabilities can abstractly be thought of as "intermediate goods" generated by exporting firms; firms adapt digital resources (e.g., social media resources) effectively to extend their existing export capabilities (e.g., social media marketing capabilities) in response to environmental changes (Eisenhardt and Martin, 2000; Elia *et al.*, 2021; Wang, 2020). These studies also align with the resource orchestration view, suggesting a resource bundling process of combining resources to improve, extend, and even create new capabilities with which to address the firm's competitive context (Sirmon *et al.*, 2007). Hence, digital capabilities emphasize resource bundling and are more impactful than digital resources.

    Digital strategy, broadly, covers a firm's activities to leverage digital resources and capabilities to achieve its objectives (Jean and Kim, 2021; McCormick and Somaya, 2020). Existing studies measure digital strategy from multiple perspectives, such as the breadth of digital strategy (digitalization usage for marketing practices). Driven by digital resources/ capabilities, exporters develop a digital marketing strategy (Gregory *et al.*, 2019) and internet marketing activities (Moon and Jain, 2007; Gnizy, 2019). Studies also consider its adoption in

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real business situations, e.g., a dummy variable of whether a firm uses the internet in the secondary data (McCormick and Somaya, 2020; Tolstoy *et al.*, 2016). Hence, a digital strategy covers practices previously identified as digital or internet-based "usage," "adoption," "strategy," and "activities." Research sees conflicts on the effect of digital strategy on EP. Some studies found a positive association between digital strategy and EP (Gregory *et al.*, 2019; Moon and Jain, 2007). Nevertheless, some studies have found nonsignificant or even a negative effect for certain EP indicators (Pergelova *et al.*, 2019; Raymond *et al.*, 2005; Tolstoy *et al.*, 2016). For instance, Pergelova *et al.* (2019) found that the adoption of digital technologies is not influential on export propensity. Therefore, key issues include how digital strategy can achieve a coalignment with contexts and how firms can implement strategy well (Kim and Ployhart, 2018). Following the resource orchestration view (D'Oria *et al.*, 2021; Sirmon *et al.*, 2007), exporting firms progress from merely possessing digital resources to developing capabilities and ultimately implementing a cohesive strategy, their impact on EP intensifies (Gregory *et al.*, 2019). We predict that:

> *H2.* The relationship of digitalization–EP is stronger for studies that operationalize it as a digital strategy than digital capabilities and weakest for studies that operationalize it as digital resources.

2.3 Contextual moderators of the digitalization–EP relationships

Internal moderators

Digital type. Recent digital technologies, such as third-party platforms, include product showcasing, aggregation, matching, and export trend analysis that enable real-time interaction and coordination. They produce value through the network-forming process (Jean and Kim, 2020) and generate new customer engagement mechanisms (Santini *et al.*, 2020). According to contingency theory, the effectiveness of these digital technologies depends on how well they fit with the firm's external environment. Thus, third-party technologies fit to

export activities more than firm websites (Jean and Kim, 2020) and alleviate the dilemma of unequal information (Gnizy, 2019). We predict that:

H3. Recent digital technologies (e.g., digital platforms) enhance the digitalization–EP relationship more effectively than traditional technologies (e.g., official websites).

Export year. A lack of accumulated experience may force less experienced exporters to consider digital technologies proactively (Morgan-Thomas and Bridgewater, 2004). However, experienced exporters are adept at scheduling and matching strategic resources to align digital strategy. They also have the stability to steer digitalization in fickle international markets. Thus, the digitalization–EP relationship is contingent upon firms' export year; experienced exporters are more likely to gain higher EP when launching digitalization.

H4. A Longer export year enhances the digitalization–EP relationship more effectively than a shorter export year.

Firm age. Older exporting firms have natural, intangible advantages when incorporating their digitalization into EP. These advantages include established reputations, market knowledge, and networks, which can facilitate the effectiveness of digitalization. In contrast, empirical studies suggest insignificant moderating effects (e.g., Wang, 2020). Following the contingency theory, we test whether the age advantage is significant in the digitalization–EP relationships, hypothesizing that older firms could be better positioned to leverage digitalization to improve EP due to their accumulated experience and resources.

H5. A longer firm age enhances the digitalization–EP relationship more effectively than a shorter firm age.

Firm size. Firm size is a double-edged sword in relation to digitalization–EP: the more variables, the flatter the size effect (Tolstoy *et al*., 2016). Larger firms, supported by greater resources, can achieve digital layouts more effectively and turn them into performance-enhancing conditions; small- and medium-sized enterprises (SMEs), however, can be more ambitious and flexible during the digitalization process, unencumbered by a long

decision-making cycle or redundant structures. Relying on resource-intensive logic, we propose that firm size strengthens the digitalization–EP relationship.

H6. Firms with larger sizes enhance the digitalization-EP relationship more effectively than firms with smaller sizes.

External moderators

Regional development. Given differences in GDP, human capital, and technology infrastructure, firms in different parts of the world differ in their ability to recognize, exploit, and internalize the knowledge underlying digital technologies and IT systems (Sabherwal and Jeyaraj, 2015). According to contingency theory, the effectiveness of digitalization may vary significantly based on regional development levels. Because of long distances and unknowable international activities, the signaling role of digitalization is stronger in non-developed markets, where exporters and their partners have to rely on digitally virtual but more credible technologies (Kim *et al.*, 2021). Firms in these regions rely on digital technologies to bridge gaps in information and credibility, making digitalization a more critical factor in achieving export performance. We suggest that:

H7. The digitalization–EP relationship is stronger in non-developed regions than in developed regions.

Developing distance. Export trade is characterized by transactional activity across international boundaries, and distance is often used to explain EP differences. We introduce regional developing distance and predict the signaling role of digitalization, which is more salient for uncertain long-distance export activities (Jean *et al.*, 2021). The digitalization–EP relationship is also contingent upon such distance. As the distance between developed and developing markets is long, exporters from developing markets rely more on digitalization to signal credibility and manage long-distance relationships effectively (Jean *et al.*, 2021).

H8. The digitalization–EP relationship is stronger over a longer developing distance than over a shorter developing distance.

Business-to-consumer (B2C) industry. Whereas B2C digitalization reflects a straightforward chain of interest coordination and information transmission, the business-to-business (B2B) digital landscape in emerging economies exhibits lower levels of customer usage and frequency. There is a relative scarcity of B2B e-commerce platforms in such contexts (Vieira *et al*., 2019). Thus, firms' digitalization effects on EP are contingent upon B2B and B2C industries. For instance, B2B firms lag behind B2C in adopting a big data strategy, as most existing big data solutions are designed to address B2C business issues (Gnizy, 2019). We suggest that the influence of digitalization on EP is stronger in the B2C industry.

> *H9.* The digitalization–EP relationship is stronger in a B2C industry than in a B2B industry

Manufacturing industry. Export success is also determined by the contingency between digitalization and industrial factors, and firms in different industries face challenges from different competitive dynamics (Gnizy, 2019). Services contexts with more intangible characteristics tend to be more heterogeneous than the manufacturing industry (Santini *et al*., 2020). Thus, the services industry is more likely to provide details to customers overseas and generate their engagement based on digitalization. Given these industrial differences, we propose that the services industry strengthens the digitalization–EP relationship, as firms in this sector are better positioned to leverage digitalization to enhance EP.

> *H10.* The digitalization–EP relationship is stronger in a services industry than in a manufacturing industry.

Institutional moderators

Regulatory institutions of study locations represent the quality of the regulatory framework and government policies in a country, including the ability to implement sound policies and respect for institutions that govern social and economic interactions (Kaufmann *et al.*, 2010).

For export activities, the ultimate concern of foreign buyers is to procure quality products from potential exporters. The lower quality of regulatory institutions makes this concern more acute, as poorer-quality laws and regulations create further obstacles for foreign buyers seeking adequate information to evaluate exporters' products and behavior. In countries with lower regulatory quality, however, digitalization can provide a substitute for institutional voids by overcoming these traditional obstacles. For instance, exporters can reach and communicate with their targeted buyers by using digital platforms and developing social media marketing capabilities; in turn, foreign buyers are more likely to trust exporters, seeking to evaluate them from developing regulatory institutions via digital functions instead of reliable market intermediaries as they did in a developed institution (Mahmoud *et al.*, 2020; Jean and Kim, 2021). Conversely, in high-regulatory countries, where institutions are robust and transactions are well-regulated, digitalization serves to enhance these existing structures rather than compensate for institutional weaknesses. Therefore, the positive relationship can be enhanced in a lower regulatory institution. Contingency theory supports this view by highlighting that the alignment between digitalization and the regulatory context is crucial for achieving superior EP.

> *H11.* The positive relationship between digitalization and EP is stronger in institutions with lower regulatory quality than with higher regulatory quality.

The ***normative institutions*** describe a prescriptive, evaluative, and obligatory dimension into social life (He *et al.*, 2013; Scott, 1995). However, this pillar has been neglected in the literature. We predict that digitalization is more effective in enhancing EP when exporters are from countries with weaker norms and values. Specifically, in contexts where normative rules are less enforced or are more flexible, digitalization can play a critical role in filling the gaps left by the lack of stringent social prescriptions. This enables exporters to innovate and adapt to market demands and opportunities. They are more likely to build relationships and transactions with foreign buyers through digitalization as regulative

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institutions (Jean and Kim, 2021). On the other hand, normative institutions are anchored in social beliefs and norms that shape what should and should not be done and can further impact a constituent's legitimacy, while such societal constraints may be weaker than absolutist politics. We predict:

H12. The positive relationship between digitalization and EP is stronger in institutions with lower normative quality than with higher normative quality

***Power distance*.** The power-distance dimension represents the degree to which social inequalities are present. Power bases tend to be stable, and power affords social order, relational harmony, and stability (Hofstede, 2001, 2011). Initial studies have predicted that successful digitalization is more likely to occur in a low power-distance environment, as IT staff are more likely to give advice to managers and be productive, presumably leading to more favorable digitalization outcomes (Leidner and Kayworth, 2006). However, recent research (e.g., Mathews *et al.*, 2016) focusing on high power-distance countries suggests that exporters in such environments promote digitalization for two reasons. First, for exporters in conditions of high power distance, staff from the overall supply chain are highly willing to conform to hierarchical orders. Thus, subordinates are less likely to dispute the decisions of their managers; digital capabilities and strategies are more effective in such cases. Second, high power distance enables tight resource-utilization mechanisms that encompass the aligned goals and interests of the exporter, its upstream, and its downstream. The "top-down" rigid control ensures the digitalization process in a unified supply chain but also fosters creative and efficient resource coordination across stakeholders. Moreover, specific studies, such as the successful digitalization initiatives in exporting firms in high power-distance countries like China and India, provide practical evidence that the contingency of hierarchical structures and strong leadership can drive effective digitalization (Lal, 2004).

H13a. The positive relationship between digitalization and EP is stronger in high power distance cultures than in low power distance cultures.

Individualism. Individualism refers to a loose social framework in which individuals are primarily responsible for themselves and exhibit greater self-determination, in contrast to collectivism, which tends to be more cooperative and group-oriented (Hofstede, 2011). Individualistic cultures tend to emphasize independence and self-determination, which may lead to more risk-taking and innovation in business operations. Unlike individualist cultures that breed differentiation and uniqueness, collectivist cultures, such as China, are more relationship-focused and emphasize collaboration within organizations, enabling a more effective digitalization process (Zhang *et al.*, 2008). Similarly, Vecchi and Brennan (2009) concluded that firms from collectivist countries spend significantly more on innovation inputs and the use of enterprise resource planning systems for operational activity. These firms display a higher performance output. Such a collectivist culture brings organizations together behind digitalization, and digitalization depends on the fit with the contingency. Moreover, collectivism can foster a highly unified internal corporate orientation with execution at its core, making it easier for firms to achieve expected performance with a high degree of concentration in digital reforms. Thus,

> *H13b*. The positive relationship between digitalization and EP is stronger in collectivistic cultures than in individualistic cultures.

Masculinity. Masculinity represents a focus on achievement, assertiveness, and material success. Femininity-led countries strengthen a balance between family and work, representing cost-effective assessment and growth of international markets (Pergelova *et al.*, 2019). Firms from femininity-led countries are influenced. For instance, they may perceive growth/international expansion as a goal that is not easily made compatible with multiple domestic and business responsibilities and time constraints. The versatility of digitalization compensates for the lack of other resources, such as the balance of multiple markets. From a micro level, Pergelova *et al.* (2019) found that female entrepreneurs develop digitalization

more effectively in gaining international marketing intelligence. In addition to the issue of work-family balance, female entrepreneurs are often excluded from or marginalized within traditional market intelligence networks. As a result, they may employ digitalization in ways that enable them to escape existing restrictive social structures. Similarly, exporters from femininity-led countries may be more likely to develop digitalization as a way to achieve EP in a cost-effective and efficient manner. Hence, the effectiveness of digitalization is contingent upon the cognitive dimensions of femininity.

H13c. The positive relationship between digitalization and EP is stronger in feminine cultures than in masculine cultures.

Long-term orientation. Long-term orientation emphasizes persistence, thrift, and loyalty. Previous research has suggested that some core competitive strategies, such as market orientation and manufacturing technologies, benefit long-term-oriented countries (Leidner and Kayworth, 2006) because the long-term orientation emphasizes durable relationships, Confucianism, and innovation (Hofstede, 2011). On the other hand, we argue that short-term-oriented countries such as the United States, Australia, Latin America, and African and Muslim countries may concentrate more on actionable digitalization. First, exporters (especially SMEs and younger enterprises) from short-term-oriented countries are more tempted to seize international opportunities rapidly to achieve quick results. Second, short-term-oriented cultures place less emphasis on tradition and are more open to new ideas (Erum *et al.*, 2017). Therefore, the circulation and implementation of digitalization become critically important in such a context.

H13d. The positive relationship between digitalization and EP is stronger in short-term-oriented cultures than in long-term-oriented cultures.

Uncertainty avoidance. Uncertainty avoidance is the degree to which people feel confident about the future (Hofstede, 2011), and it has received much research attention in the digital context (Leidner and Kayworth, 2006). According to previous information system

reviews, firms from low uncertainty avoidance countries are more likely to engage in digitalization because they dislike formal rules. By contrast, those less comfortable with uncertainty may avoid digitalization, which is inherently risky (Straub, 1994). However, exporting firms from high uncertainty-avoidance countries face a high degree of formalization and bureaucracy, resulting in a lack of flexibility in the home market (Kirca *et al.*, 2005). For self-rescue purposes, exporters may choose digitalization to break through the rigid system since digital technology is characterized by global information-chasing and low cost. Moreover, export managers are more likely to build "strict behavioral codes, laws and rules, disapproval of deviant opinions, and a belief in absolute truth" (Hofstede, 2011, p. 10) to minimize ambiguous or unknown situations in their countries through digitalization. Hence, the digitalization–EP relationship is contingent upon uncertainty-avoidance contexts.

> *H13e*. The positive relationship between digitalization and EP is stronger in high uncertainty avoidance cultures than in low uncertainty avoidance cultures.

2.4 Method moderators of the digitalization–EP relationships

Secondary data are limited in detail and may not match the exact needs of the research, while survey-based data can address these limitations through additional details and contextual variables, thereby facilitating more uniform data definitions. Thus, survey design is more likely to capture digitalization impacts accurately. We examine three issues of measurement: the time period of measuring EP, the fact that the binary structure of digitalization may not capture real effects as studies that adopt detailed measurements, and the fact that different EP indicators may be impacted differently by digitalization (Tan and Sousa, 2015). We control for whether studies adopt back-translation techniques, as this ensures the accuracy and cultural relevance of survey instruments, which can affect the measurement of digitalization's impact on EP. We consider whether studies are published in journals, as peer-reviewed publications tend to have higher methodological rigor and are more likely to report

significant findings than others. We control for longitudinal design, capturing the dynamic nature of digitalization's effects over time. However, the effect may be smaller compared to cross-sectional studies due to the extended timeframe over which digitalization's impact is observed, potentially diluting immediate effects. Finally, we propose that the positive effect of digitalization on EP is stronger in studies with more recent data collection years compared to those with older data collection years. In line with contingency theory, the alignment between digitalization and complex contingencies influences effectiveness. Newer studies are expected to capture more advanced and relevant digitalization practices, leading to a stronger impact on EP.

3. Method

3.1 Data collection and inclusion criteria

We applied a multi-step procedure to identify the relevant studies. First, we manually reviewed the reference sections of key review articles on EP or digital technology (*Chen et al.*, 2016; Katsikeas *et al.*, 2016). Second, we searched in electronic databases, including Google Scholar, JSTOR, ProQuest, EBSCO, Web of Science, and ScienceDirect, using keywords including *digitalization, information technology, internet, digital, social media, web 2.0, website, e-commerce, cybersecurity, and World Wide Web, in combination with exporting (export, export performance, exporting firms, exporters).* We searched for the titles of potential studies and their abstracts. In addition, we searched for studies published in the grey literature, including conference proceedings and dissertations (Blut *et al.*, 2023). We also posted messages on the ELMAR mailing list calling for additional unpublished studies and data relevant to the meta-analysis. Five criteria determine whether studies enter the meta-analysis. First, studies should examine the impact of digitalization at the firm level within export settings; we excluded studies that considered the topic at the industry, regional, or country level. We also checked technology-related factors, such as technology capabilities, to

ensure they were digital-related. Most of the studies in the international business domain define technical variables with respect to advanced product and process technologies to explain the competitiveness of the firm. Our study focuses on those digital technologies that support the exporting process (e.g., Raymond *et al*. 2005). Second, we require empirical studies and thus exclude conceptual articles. Third, studies should be written in the English language. Fourth, studies should report statistical information for key relationships of our meta-analytic framework that can be converted to usable effect sizes (i.e., correlation and standardized regression coefficient) (Peterson and Brown, 2005). Fifth, we consider studies conducted after the year 1990, given that a major part of the empirical research on digitalization–EP dates back to the mid-1990s. Studies not meeting these criteria were excluded. In total, we gained 106 independent samples from 99 studies involving 62,082 respondents. Among these, 15 were unpublished, including dissertations, working papers, and conference papers.

3.2 Coding of effect size, effect size integration, and multivariate analyses

We extracted and classified the coded effect sizes according to the variables and definitions. We also coded sample size, reliability of the predictor, and potential contextual and methodological moderators (e.g., data collection year, firm characteristics, sample country). We integrated effect sizes using a combined method by Hedges and Olkin (1985) and Hunter and Schmidt (2004). Before integrating effect sizes, we corrected correlation coefficients for measurement error (Hunter and Schmidt, 2004), and we divided the correlations by the square root of the product of the reliabilities of the two constructs. When a specific study did not report the required reliability information, we used the average reliability of that construct. We then weighted the reliability-adjusted correlations using the inverse-variance weight. Our unit of analysis is a study's sample; for studies using multiple measures of a

single construct (e.g., digitalization variables or EP) and reporting separate effect sizes for each measure, we averaged these within a sample to yield a single effect size.

The cumulative reliability-corrected correlations were computed using the z-transformation method in Comprehensive Meta-Analysis 3 (Hedges and Olkin, 1985). We also reported the number of effect sizes (k), cumulative sample size (N), 95% confidence intervals, Q-statistic, I^2 statistic, and fail-safe N for each evaluated relationship. A significant Q-test indicates substantial variance in effect size distribution (Hunter and Schmidt, 2004). The I^2 statistic suggests the proportion of variation due to between-study heterogeneity, with an I^2 value greater than 75% indicating substantial heterogeneity in effect sizes (Higgins and Thompson, 2002). The fail-safe N (FSN) refers to the number of studies with null results needed to reduce a significant relationship to a barely significant level. FSNs should be larger than 5 * k + 10, where k is the number of studies (Rosenthal, 1979). We also used funnel plots to assess publication bias. An asymmetric funnel plot indicates potential publication bias. We employed multivariate analyses to test the relationships in the framework; we used subgroup and meta-regression analysis to assess the moderating influence on effect sizes.

4. Results

4.1 Results of effect size integration

The study employs a random effect approach based on existing literature (Blut *et al*., 2023; Hunter and Schmidt, 2004). The results of the bivariate analyses in Table III show that overall, digitalization is significantly correlated to EP (*rc*=0.36, *p*=0.00), indicating that exporting firms that adopt digitalization tend to achieve better outcomes. *H1* is supported. This relationship is supported by high heterogeneity (Q = 1,414, I-squared = 97%) and a substantial fail-safe N (FSNs = 59,152), indicating the robustness of this finding. The slight asymmetry observed in the forest plot indicates potential publication bias, with a tendency for studies showing positive results to be published more frequently. Moreover, we used "one

study removed" sensitivity analysis to demonstrate the stability of the overall effect size, which is unlikely influenced by any single study (Web appendix D shows forest plot and sensitivity analysis; Borenstein *et al*., 2021).

Specifically, digital capabilities exhibit the strongest positive effect on EP (rc=0.54, p=0.00). According to the RBT, digital strategy should be most relevant, yet it has a weaker effect than capabilities (rc=0.31, p<0.05), indicating the need for further exploration of the factors influencing the relationship. In contrast, digital resources display weak relationships with EP (rc=0.18, p>0.05), suggesting the owning stage of digital resources is insufficient without effective utilization and strategic alignment. All relationships were robust against publication bias, as the calculated FSNs exceeded the tolerance levels proposed by Rosenthal (1979). However, the Q-test of homogeneity is significant, suggesting that moderator analysis of digitalization–EP is necessary.

--- TABLE III ABOUT HERE ---

4.2 Moderator analyses

We examined the moderating influence of digitalization types, contextual moderators, and methodological moderators. Following Blut *et al*. (2023), we explored the moderating influence of these characteristics using subgroup analysis. First, we conducted a subgroup analysis and examined the reliability-adjusted and weighted correlations (*rc*) by each side of the moderator variables and controls. We applied subgroup analysis when at least two effect sizes were available for each side of the controls (Blut *et al*., 2023). We correlated them with effect sizes for continuous moderators and controls, such as institutional factors (Hunter and Schmidt, 2004). We then conducted random-effects meta-regression and examined the joint influence of those variables that had displayed significant differences in the subgroup analysis.

Subgroup analysis. Table IV shows the results for the digitalization–EP (k=81). Contrary to *H2*, the digitalization effect is more effective when studies consider digital capabilities than when they consider digital strategy, digital resources, or hybrid types ($rc_{capabilities}$=0.62 vs. rc_{others}=0.33, p<0.05), whereas the other two digitalization types do not significantly moderate the main effect. In line with the result of effect size, the digitalization effect is weaker for digital resources ($rc_{resources}$= 0.18 vs. rc_{others}=0.39, p<0.1) and digital strategy ($rc_{strategy}$=0.33 vs. rc_{others}=0.43, p<0.1). These findings highlight significant heterogeneity among the studies, particularly for digital capabilities, emphasizing the importance of leveraging firm capabilities to enhance EP.

We found digitalization was more effective in firms with longer export experience (rc_{short}=0.35 vs. rc_{long}=0.84, p<0.05) and firm age (rc_{short}=0.35 vs. rc_{long}=0.50, p<0.1), non-B2B industry (rc_{B2B}=0.11 vs. $rc_{non-B2B}$=0.40, p<0.05), and developing regions ($rc_{developed}$=0.30 vs. $rc_{non-developed}$=0.45, p<0.05). *H4*, *H6*, *H7*, and *H9* are supported. Contrary to *H3,* traditional digital technologies have a stronger impact than newer technologies ($rc_{traditional}$=0.38 vs. rc_{new}=0.37, p>0.05), possibly because these traditional technologies are more established and widely accepted in business processes. *H5* is not supported; smaller firms benefit more from digitalization in terms of EP compared to larger firms (rc_{large}=0.32 vs. rc_{SME}=0.38, p<0.1), likely due to their greater flexibility and quicker decision-making processes. The remaining results are not significant (*H8, H10*), but directions are consistent with the hypotheses. The effects of digitalization on EP were influenced by five method moderators. The effects were weaker when the digital strategy was measured using binary measures (rc_{binary}=0.16 vs. $rc_{non-binary}$=0.41, p<0.05) and EP ($rc_{non-propensity}$=0.40 vs. $rc_{propensity}$=0.22, p<0.1) was measured using propensity measures. Survey-based (rc_{survey}=0.40 vs. $rc_{nonsurvey}$=0.16, p<0.1) and non-longitudinal (rc_{longi}=0.16 vs. $rc_{nonlongi}$=0.39, p<0.1) study designs showed a stronger

digitalization–EP relationship. The back translation technique showed a weaker relationship ($rc_{\text{translation}}$=0.51 vs. $rc_{\text{nonltranslation}}$=0.35, p<0.1).

Among the various types of moderators examined, institutional moderators emerged as the most influential in shaping the digitalization–EP relationship. Specifically, the effect of digitalization was stronger under unsatisfactory regulative institutions (*H11*: r=-0.23, p<0.05) and when normative institutions ranked low (*H12*: r=0.21, p<0.05). The effect was also weaker in cultures high in individualism (*H13b*: r=-0.23, p<0.05), masculinity (*H13c*: r=-0.30, p<0.05), long-term orientation (*H13d*: r=-0.15, p<0.1), and stronger in a high level of power-distance (*H13a*: r=0.26, p<0.05).

Meta-regression. We validated these results using random-effect meta-regression, as subgroup analysis does not consider the joint influence of the control and moderator variables (Blut et al., 2023). We regressed the effect sizes on the ten moderators found to be significant (p<0.05) in the subgroup analysis. As shown in Table V, we observed stronger effects of digitalization for digital capabilities (β=0.19, p<0.05) and experienced exporting firms (β=0.38, p<0.05). The relationship is weaker when studies use a binary measurement of digital strategy (β=-0.18, p=0.07), exporting firms are from B2B industries (β=-0.20, p=0.05), and when the country culture is higher in masculinity (β=-0.29, p<0.05). Overall, the direction of the significant moderating effects was in line with the results of the subgroup analysis. The moderators explained 43% of the variance, and the largest variance inflation factor was 6.15, which indicates that multicollinearity is not an issue in the analysis.

--- TABLE IV AND V ABOUT HERE ---

5. Discussion

This meta-analysis was motivated by two gaps in the literature concerning digitalization in exporting. We developed and tested a comprehensive meta-analytic framework that produced the results summarized in Figure 2. It offers answers to important questions outlined below.

--- FIGURE 2 ABOUT HERE ---

5.1 Does digitalization influence EP?

After integrating digitalization types, i.e., digital resources, capabilities, and strategy, under

the digitalization umbrella, the univariate results indicate a positive relationship between

digitalization and EP (*rc*=0.36). Our digitalization–EP framework synthesizes previous

research and establish digitalization as an independent determinant of EP under RBT.

Moreover, the univariate results reveal the strongest direct effects of digital capabilities on EP

(*rc*=0.54), followed by digital strategy (*rc*=0.31), and then digital resources (*rc*=0.18). There

is the potential to address issues raised within the RBT literature of seeing capabilities in

terms of resource possession rather than use (Barney *et al.*, 2021). Owning digital resources

ensures that a firm takes orchestration actions; the two are inextricably linked and

interdependent. The findings confirm the role of capabilities in the resource orchestration

path (D'Oria *et al.*, 2021) and in export success (Tolstoy *et al.*, 2021) rather than the resource

possession prioritized in previous RBT and EP frameworks. Notably, the impact of digital

strategy on EP is weaker; the effectiveness of digital strategy may depend on various

contextual and method factors, such as the specific market conditions and the firm's ability to

implement these strategies effectively. As some studies consider digital strategy as a binary

structure, our review highlights the need for more precise measurement and understanding of

digital strategy to fully grasp its role in enhancing EP.

5.2 When does digitalization influence EP?

The meta-analysis provides a nuanced understanding of how types of digitalization—digital

resources, capabilities, and strategy—moderate the direct relationship. The results highlight

digital capabilities, which have stronger moderating roles in both subgroup analysis and

meta-regression, while digital resources and strategy play marginal moderating roles in

subgroup analysis. In line with findings on direct effects, it highlights the need to move

beyond a traditional resource-centric view and consider the dynamic processes through which firms deploy and manage their digital resources (D'Oria *et al.*, 2021).

In response to recent calls (Chen *et al.*, 2016; Jean and Kim, 2021; Meyer *et al.*, 2023), this study contributes to the exporting literature by examining how internal and external contextual contingencies hence help to explain previous inconsistent EP outcomes in relation to digitalization. Contingencies are particularly highlighted in RBT and exporting literature (Chen *et al.*, 2016; Sirmon *et al.*, 2007), and cross-boundary institutions stand as predominant factors in elucidating the diverse aspects of EP (Chen *et al.*, 2016). The subgroup analysis shows that the digitalization–EP connection is stronger in the B2C industry, developing regions, and for firms with longer export experience; the moderating roles of export year and the B2C industry are more robust in meta-regression. Diving deeper into the role of institutional moderators based on reported home countries, it is evident that their influences are multifaceted. Lower-level regulative institutions, when lacking well-developed formal rules and frameworks, can facilitate effective digitalization objectives. Digitalization–EP is also enhanced in low normative institutional environments, as weaker social norms allow for more flexible digitalization. Cognitive institutional dimensions, as defined by Hofstede, uniquely influence digitalization's effectiveness in the exporting context. High power distance enhances digitalization's impact, while individualism, masculinity, and long-term orientation weaken it; masculinity is also robust in the meta-regression. Although uncertainty avoidance is widely studied in IT literature (Leidner and Kayworth, 2006), it failed to impact the relationship. These findings clarify Hofstede's specific dimensions where the impact of digitalization is central to EP, and the varying effects of these cognitive institutional moderators emphasize the importance of tailoring digitalization to fit the cultural context of the exporting firms. The choice of a suitable digitalization way to boost firm performance becomes increasingly intricate in the

international business landscape. This is due to the fact that perceptions and prioritizations of digitalization can oscillate widely across varying institutional setups. Hence, the study particularly fixes a criticism that past studies have ignored the institutions in which exporting firms operate by showing that the digitalization–EP relationship is influenced by regulative, normative, and cognitive institutions (Peng *et al.*, 2008). Previous studies have not examined the importance of institutional environments in shaping digitalization effectiveness. By weaving together disparate strands of literature—spanning digitalization, institutions, and EP—the study provides a cohesive map and clarifies the firm-level, regional, and industrial contexts in which digitalization effects are central to EP.

Upon conducting our meta-analysis, we also identified variations in the digitalization–EP relationship based on method moderators. These variations are attributed to strategy measurement and data collection methods, clarifying the subtle influence of digitalization on EP. Notably, our study responds to recent calls from the international business field that require the use of multiple methodological procedures to mitigate potential biases and limitations of a single method (Nielsen *et al.*, 2020). Our findings, especially those emphasizing the significance of certain methodological differences and the lack of significance of others (such as longitudinal design and back translation), underscore the imperative for meticulous method selection and the refinement of construct definitions in subsequent research.

5.3 Managerial implications

This study has several implications for export managers seeking to manage the digitalization process effectively. Export managers looking to fully leverage the benefits of digitalization must first overcome the limitations imposed by traditional functional boundaries. To achieve this, export managers can deploy digital resources within their existing capabilities to break down silos between multiple functions within their organization. Export managers should

also know that digitalization is the emphasis, especially on how to better orchestrate digital resources rather than the possession. This differentiation is especially crucial for small- and medium-sized enterprises, which often have limited resources and experience. Specifically, in addition to launching internal digitalization efforts such as staff training, and online website/ software upgrading, managers can consider technology outsourcing for using the latest digital infrastructures (Wang, 2020) or absorb digital capabilities through their digital partnerships, such as digital platforms (Jean and Kim, 2021).

Moreover, it is also important to develop key performance indicators for measuring digitalization, such as management of consumer relationships, big data, and suppliers through new digital functions.

To ensure maximum efficiency, export managers can also evaluate the fitness of environments carefully and determine which digital activities are appropriate. Hence, managers must integrate their insights into the digitalization landscape into internal and external contexts. When exporting firms are from regions with lower-level regulative and normative institutions, masculinity, and individualism, managers can consider prioritizing digitalization for better outcomes. This approach harnesses the potential of digitalization by aligning with institutions, offering a more tailored and effective roadmap for superior export outcomes. Export experience, B2C industry, and developing regions can also promote the value generation of the digitalization process. Awareness of the contingencies of investing in digitalization is necessary to realize a company's potential for generating superior EP.

5.4 Limitations and future research

The first limitation of this review is that, like any meta-analysis, it relies on data from existing studies. Future studies should consider *novel mechanisms*, testing theoretical mediators between digitalization and EP to clarify the mechanism within the existing framework.

Second, we did not find the expected strongest positive effect of digital strategy on EP, a result that is not in full alignment with the resource orchestration perspective. Future studies should pay attention to the *measurement of digital strategy*, matching digital strategy with factors in the environment, the organization, and the international markets, such as strategy efficiency in specific marketing elements (Gregory *et al.*, 2019).

Third, our meta-analysis focuses on the export outcome of digitalization without discussing antecedents of digitalization, and future research should, therefore, broaden the *scope of antecedents.* For example, few studies have explored the antecedents of digital capability, such as human resources, financial resources, and environmental factors. Future studies could investigate other capabilities, e.g., architectural capability, that may interact with digital capability. Specifically, as the architectural capability represents a process that orchestrates multiple specialized capabilities and their associated resource inputs, cooperation among diverse capabilities would provide further insights into the role of digital capability. When developing digital capabilities (inside-out), exporting firms may also need architectural capabilities (outside-in) to align with the market (Gregory *et al*. 2019; Morgan 2012). Integrating digital capability with these capabilities could help the development of digitalization and expand the RBT-based framework. There are also antecedents of digital strategies that have yet to be fully explored. Scholars can consider more internal antecedents, such as managerial perceptions of digitalization, and specific-task environments in different contexts, such as heterogeneity, competition, customer preferences, and industrial level.

Fourth, more research is needed on *novel outcomes*, particularly from the perspectives of the importer–export relationship and importer performance; the dark side of the impact of digitalization on performance in the export domain should also be investigated. Although we found an overall positive digitalization–EP relationship, the limited number of effect sizes for

subgroups meant that we were unable to compare digitalization–EP effects depending on EP indicators. Future studies could therefore usefully track and compare the effects of digitalization on diverse performance measures.

Finally, our moderator analysis is limited by the nature of the data in previous studies and the coding of moderators at the sample level. Scholars should therefore consider *novel moderators*, such as marketing mix, types of digital technology, other firm-level resources, industrial moderators, and institutional distance; they should use primary data (host market characteristics, managerial characteristics, and distance) and real-life environments (like the recent pandemic) that reshape business activities. Future studies should enrich moderators between digital capabilities and EP, which has received only half the attention due to the relationship between digital strategy and EP.

Finally, researchers should use a *variety of research designs*, including experimental designs, panel data, and mixed methods, to explore neglected relationships, cross-country differences, and longitudinal changes. We also find some evidence in previous research that is contradictory or insignificant. These shortcomings could be addressed using qualitative research methods, such as in-depth interviews, which would help to explain digital phenomena and develop appropriate measurements.

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Table I. Construct Definitions and Operationalizations of the Framework

Construct	Definitions/ operationalizations	Aliases
Digitalization		
Digital resources	Refers to both firms' tangible and intangible digital assets and abilities available within the firm (Barney *et al.*, 2021; Gregory *et al.*, 2019).	Internet experience; website age; infrastructure; social media/ website/ information system resources
Digital capabilities	Refers to the exporting firm's ability to structure and bundle digital resources to support export activities (Gregory *et al.*, 2019; Wang, 2020)	Internet marketing capabilities; platform/ web capability; e-commerce capabilities; digital marketing capabilities
Digital strategy	Refers to a firm's digital activities to leverage resources and capabilities for achieving objectives (Jean and Kim, 2021; McCormick and Somaya, 2020).	Internet marketing activities; internet/ ICT/ big data usage; e-platform/ social media use; marketing efficiency by e-commerce
Outcome of digitalization		
Export performance	Refers to the outcome of a firm's activities in its export markets (Chen *et al.*, 2016).	Export marketing performance; export financial performance; export intensity; export propensity

Table II. Definitions of Moderators

Digitalization types	
Digital resources	Dummy-coded whether the study examines digital resources independently (1) or otherwise (2)
Digital capabilities	Dummy-coded whether the study examines digital capabilities independently (1) or otherwise (2)
Digital strategy	Dummy-coded whether the study examines digital strategy independently (1) or otherwise (2)
External contextual moderators	
Institutional characteristics based on home country [a]	
Regulative institutions of the home country	Averaged scores of The Worldwide Governance Indicators (WGI) project (Kaufmann *et al.*, 2010), ranging from low (-2.5) to high (+2.5); the meta-analysis uses the WGI score of the year when the study was published.
Normative institution of the home country	Ranking of Global Competitiveness Report covering 12 pillars (Xu *et al.*, 2004): institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, and innovation.
Cognitive institutions of the home country: *Hofstede model of national culture (Hofstede, 2001)*	
-Power distance	The extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally, ranging from low (0) to high (100).
-Individualism	The degree of interdependence a society maintains among its members, ranging from low (0) to high (100).
-Masculinity	What motivates people, wanting to be the best (Masculine) or liking what you do (Feminine), ranging from low (0) to high (100).
-Uncertainty avoidance	The extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these, ranging from low (0) to high (100).
-Long-term orientation	The extent to how every society has to maintain some links with its own past while dealing with the challenges of the present and future, ranging from low (0) to high (100).
Manufacturing industrial comparison	Dummy-coded whether the study examines the manufacturing industry (1) or non-manufacturing industry (2).
B2B industrial comparison [b]	Dummy-coded whether the study examines the B2B industry (1) or does not consider B2B (2).
Regional development of the home country	Dummy-coded whether the study examines developed region (1) or non-developed region (2).
Developing distance [c]	Dummy-coded whether the study examines long developing distance, e.g., export from developed regions to developing regions (1) or otherwise (2).
Internal contextual moderators	
Export experience [e]	Dummy-coded whether the study examines short export experience with less than 20 years (1) or long (2).
Firm Size [d]	Dummy-coded whether the study examines large-size firms (1) or SMEs (2)
Firm Age [e]	Dummy-coded whether the study examines short firm age with less than 20 years (1) or long (2).
Digital technology type	Dummy-coded whether the study examines new digital platforms (1) or traditional tools (2).
Method moderators	

Study design	Dummy-coded whether the study uses survey data (1) or non-survey data (2).
Longitudinal study	Dummy-coded whether the study uses longitudinal study design (1) or non-longitudinal study (2).
Time lag for EP measurement	Dummy-coded whether the study measures EP without no lag (1) or considers lag (2).
Back translation	Dummy-coded whether the study uses back translation technique (1) or not (2).
Publication	Dummy-coded whether the study is an article (1) or others (2).
Measurement for strategy	Dummy-coded whether the study measures digital marketing strategy with binary structure (1) or others (2).
Measurement for EP type	Dummy-coded whether the study measures EP with propensity (1) or others (2)
Data collected year [f]	Year of data collection of the study.

[a] For those continuous moderators, we exclude studies that collect data from multiple regions

[b] The variable was coded based on studies that report the main international market. For exporters from developing regions, who mainly enter developed markets, we coded them as being far from the economic level.

[c] We tried to capture time effects during the development of digital technologies; we collected the year of data collection as the publication year of some studies seriously lags behind their data collection. Once the study lacks this information, we replace it with the publication year minus three.

[d] We categorized firms into "SME" and "large" based on the mean size provided in each sample. Consistent with commonly accepted standards, firms with more than 250 employees were classified as large enterprises, whereas those with fewer employees were considered SMEs.

[e] We established a threshold of 20 years to differentiate between lower and higher experience or age groups. The threshold of 20 was selected based on the average values of age and experience reported across the samples. This average was notably close to 20, which prompted us to use it as a natural breakpoint for categorizing firms into groups with "lower" and "higher" age or experience.

[f] We tried to capture the time effects during the development of digital technologies. We collected the year of data collection as the publication year of some studies seriously lags their data collection. Once the study lacks this information, we replace it with the publication year minus three.

Table III. Univariate Results

Relationship	k	N	rc	CI $_{low}$	CI $_{high}$	Q-value	df	I-squared	FSNs
Digitalization → EP (H1)	81	55,590	0.36*	0.28	0.41	1,414 (0.00)	80	97%	59,152
-digital resources → EP	5	7,466	0.18	-0.01	0.35	199.5 (0.00)	4	98%	123
-digital capabilities → EP	14	2,915	0.54*	0.23	0.75	1,270 (0.00)	13	99%	4,761
-digital strategy → EP	42	40,815	0.31*	0.26	0.37	1,223 (0.00)	41	97%	2,934

k=number of effect sizes; N=cumulative sample size; rc=sample-weighted reliability adjusted average correlation; CI=95%-confidence interval; Q=Q statistic; FSN=fail-safe N.

* $p<0.05$; p values are in parentheses.

Table IV. Results of Random Effects ANOVA for the Digitalization–EP Relationship

Moderator	Level	Digitalization → EP		
Digitalization types (*H2*)		**k**	*rc*	**Q**
Digital resources	Resources	**5**	**0.18**	**2.21**[+]
	Others	**76**	**0.39**[*]	
Digital capabilities	Capabilities	**14**	**0.62**[*]	**13.80**[*]
	Others	**67**	**0.33**[*]	
Digital strategy	Strategy	**42**	**0.33**[*]	**2.25**[+]
	Others	**39**	**0.43**[*]	
Internal moderators				
Digital type (*H3*)	Third-party	14	0.37[*]	0.02
	others (traditional and mixed)	67	0.38[*]	
Export year (*H4*)	Short (<= 20 years)	75	0.35[*]	18.55[*]
	Long (>20 years)	6	0.84[*]	
Firm size (*H5*)	Large size	7	0.32[*]	0.29
	SME	74	0.38[*]	
Firm age (*H6*)	Short (<= 20 years)	64	0.35[*]	2.84[+]
	Long (> 20 years)	17	0.50[*]	
Methodological moderators				
Measurement for strategy	Binary	11	0.16[+]	6.71[*]
	Non-binary	70	0.41[*]	
Measurement for EP	Non-propensity	72	0.40[*]	2.28[+]
	Propensity	9	0.22[*]	
Publication	Article	66	0.39[*]	0.56
	Non-article	15	0.32[*]	
EP in the next time period	Lagged period (e.g., *t*+1)	16	0.35[*]	0.20
	Same period (*t*)	65	0.39[*]	
Back translation	Translation	15	0.51[*]	3.90[*]
	Non-translation	66	0.35[*]	
Study design	Survey	74	0.40[*]	4.04[+]
	Non-survey	7	0.16	
Longitudinal study	Longitudinal	5	0.16	2.56[+]
	Non-longitudinal	76	0.39[*]	
External moderators				
Region(s) (*H7*)	Developed	39	0.30[*]	4.69[*]
	Non-developed	42	0.45[*]	
Distance (*H8*)	Long	3	0.39[*]	0.01
	Otherwise	78	0.38[*]	
B2B industry (*H9*)	B2B focused	7	0.11	6.01[*]
	Otherwise	74	0.40[*]	
Manufacturing industry (*H10*)	Pure manufacturing	30	0.36[*]	0.15
	mixed	51	0.39[*]	
Regulative institutions (*H11*) [a]		77	r=-0.23[*]	
Normative institutions (*H12*) [a]		77	r=0.21[*]	
Cognitive institutions [a]	Power distance (*H13a*)	77	r=0.26[*]	
	Individualism (*H13b*)	77	r=-0.23[*]	
	Masculinity (*H13c*)	77	r=-0.30[*]	
	Long-term orientation (*H13d*)	77	r=-0.15[+]	
	Uncertainty avoidance (*H13e*)	77	r=-0.05	
Data collected year [a]		78	r=0.06	

k=number of effect sizes; Q tests whether the size of the effect differs among the levels of the moderator. [a] We correlated continuous moderators with effect sizes (one-tailed; Blut *et al.,* 2023).

A dash indicates that the subgroup result cannot be compared due to the low number of effect sizes.

[+] *p*<0.1

[*] *p*<0.05.

Table V. Results of Random Effects Meta-Regression for the Digitalization–EP Relationship

Moderator	Beta	SE	*p*
H2: Digital capabilities	0.19[*]	0.09	0.05
H4: Export year: long (vs. short)	0.38[*]	0.14	0.00
Measurement for strategy: binary (vs. non-binary)	-0.18[+]	0.11	0.07
Back translation (vs. non-back translation)	0.08	0.10	0.45
H7: Region: non-developed (vs. developed)	0.22	0.13	0.22
H9: Industry: B2B (vs. non-B2B)	-0.20[*]	0.12	0.05
H11: Regulative institutions	-0.22	0.09	0.33
H12: Normative institutions	-0.00	0.00	0.94
H13b: Individualism	0.24	0.00	0.17
H13c Masculinity	-0.30[*]	0.00	0.01
R^2= 0.43; k=77; Variance Inflation Factor $_{max}$=6.15			

Note: Standardized coefficients are shown in this table. Effect sizes exclude studies that collect data from multiple regions.

[*] *p*<0.05, [+] *p*<0.1 (two-tail).

Table VI. Agenda for Research on Digitalization in Exporting

| Theme/issue	Key illustrative recommendations
Consider novel mechanisms	• Test mechanism between digitalization and EP using other theories (e.g., relationship theory, competitive advantage theory)
Measurement of digitalized strategy	• Consider strategy measurement which can match with other factors in the environments, in the organization, and in the international markets
Broaden the scope of antecedents	• Broaden determinants impact digital capability (e.g., firm age, human resources, digital investment) • Use RBT to test the integration of other capabilities with digitalized capabilities and strategies (e.g., architectural capabilities) • Examine how negative perceptions impact digital strategy in some cases • Test more specific task environmental factors (e.g., competition, customer preferences, and technology) • Assess environmental heterogeneity (e.g., distance)
Consider novel outcomes	• Examine the effects of digitalization on new outcomes (e.g., relationship performance) • Assess and compare diverse performance measures (export propensity, marketing performance, financial performance) • Examine the "dark-side" effects of digitalization on EP
Consider novel moderators	• Test different digital technologies as a context • Broaden moderators proposed in the international business literature (e.g., marketing mix elements, institutional distance) • Assess novel moderators about host markets, managers' characteristics, and distance using primary data • Consider carefully specific context (e.g., pandemic) • Broaden moderator test for the digital capabilities-EP relationship
Use a variety of research designs	• Employ experimental design panel data to unfold the unexplored relationships and reveal cross-country differences and longitudinal changes • Employ qualitative research for more explanations (e.g., in-depth interview)
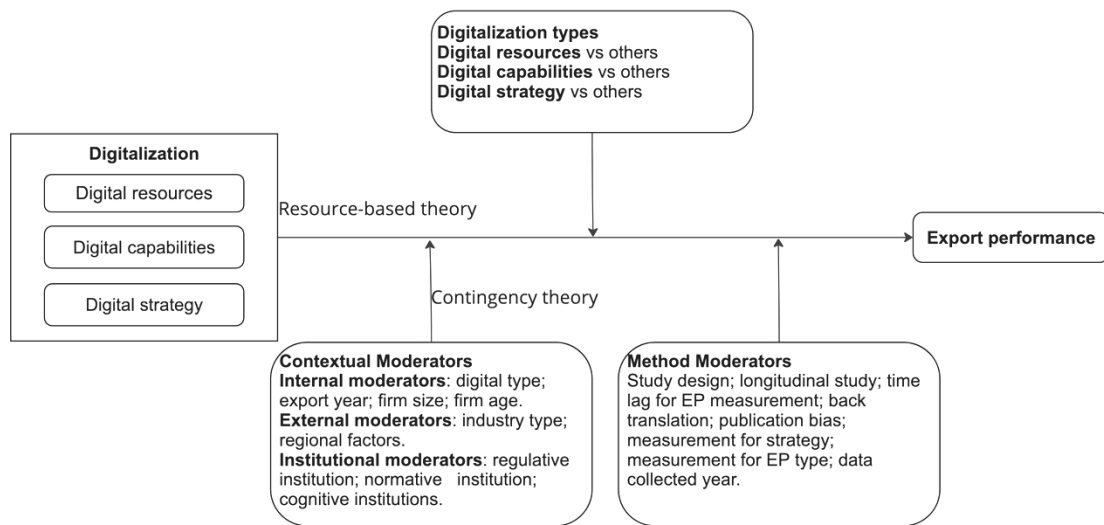
Figure 1. Meta-Analytic Framework
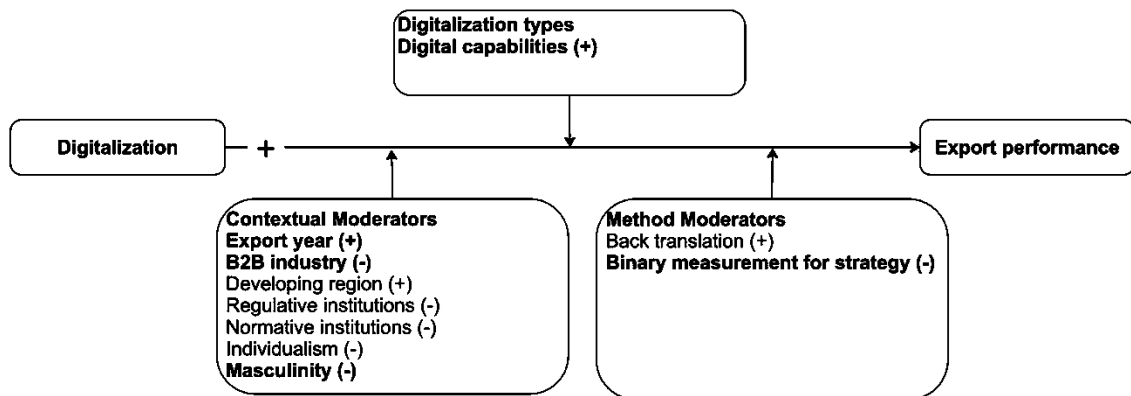
Note: The figure shows all significant moderators (p<0.05) from the subgroup analysis, with those that remain significant in the meta-regression highlighted in bold.

Figure 2. Result of the Meta-Analytic Framework

APPENDIX A: KEY REVIEWS ON THE DIGITALIZATION AND EP FRAMEWORK

Recent export reviews reveal theoretical and conceptual advancements in identifying factors affecting EP, as shown in Table 1. Reviews have used resource-based theory (RBT) and contingency theory to identify and group the determinants of EP into internal and external perspectives. While some studies have focused on the direct links between determinants and EP, others have emphasized export marketing strategy that leverages for advantage and superior EP (Chen *et al*., 2016; Leonidou *et al.*, 2002). Nevertheless, the roles of digital capabilities and strategy are only implicitly included in these reviews rather than an independent digitalization construct (Chen *et al.*, 2016). Digital technologies imply new opportunities for exporting firms to leverage a whole new set of capabilities and create a new level of global connectivity needed for successful international operations (Katsikea *et al.*, 2020), thus an independent digital construct as the determinant of EP is needed.

Although the management and information system literature has been undertaken that digital tangible and intangible assets are being priced into the market value of firms (Hanelt *et al.*, 2021; Saunders & Brynjolfsson, 2016). There are still several challenges involved in the internationalization of firms, such as contextual differences between the home and host countries, information asymmetry, and managerial/ operational complexity (Jean *et al*., 2021). A limited number of studies has undertaken the value of digital technologies differs across domestic and foreign operations (Mithas *et al.*, 2017). Considering the exporting context and existing EP frameworks, this study aims to contribute to the exporting literature and that integrate digitalization into export theorization.

Table 1. Key reviews on export and digitalization

References	Study Design and Sample	Digitalization included	Export context	Institutional moderations included	Moderator categorizing
Aaby & Slater (1989)	Literature review: 55 studies published between 1978 and 1988	No	Yes	No	No
Leonidou *et al.* (2002) [b]	Meta-analysis: 36 studies	No	Yes	No	No
Sousa *et al.* (2008) [a]	Literature review: 52 studies published between 1998 and 2005	No	Yes	No	Yes (foreign market characteristics, firm characteristics)
Tan and Sousa (2015) [b]	Meta-analysis: 11 studies of 135 effects	No	Yes	No	None
Chen *et al.* (2016) [a]	Literature review: 124 studies published between 2006 and 2014	No	Yes	No	Yes (Internal variables, external variables)
Katsikea *et al.* (2020)	Conceptual paper	Yes (online organizational resources, online organizational capabilities)	Yes	No	No
Herhausen *et al.* (2020)	Literature review: 129 studies after 2000	Yes (digital marketing capabilities)	No (B2B firms)	No	No
Hanelt *et al.* (2020)	Literature review: 279 peer-reviewed articles	Yes (technology impact, compartmentalized adaptation, systemic shift and holistic co-evolution)	No (general firms)	No	No
Samiee (2020)	Integrative review	Yes (internet)	No (international marketing)	No	No
This study	Meta-analysis: 106 independent samples from 99 studies between 2000 and 2024	Yes (digital capabilities vs. digital strategy)	Yes	Yes	Yes (internal factors, external factors, institutional moderators, method factors)

[a] Digitization-related literature is included in the review. For instance, internet marketing activities (formally named as digital strategy in this study) have been categorized as the export marketing strategy (Moon & Jain, 2007)

[b] Leonidou *et al.* (2002) prove the dual relationship of export marketing strategy-EP. Tan and Sousa (2015) illustrate that export marketing capabilities promote EP directly and indirectly through competitive advantages. Our meta-analysis first examined digitalization as an independent construct, comprehensively expanding antecedents, mediators, and moderators of digitalization.

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APPENDIX B. SELECTED STUDIES ON THE PERFORMANCE OUTCOMES OF DIGITALIZATION

Authors (year)	Theoretical Framing	Digitalization variable(s)	Country	Key insight(s)
Davis and Harveston (2000)	/	Internet usage (DS)	US	Internet usage positively influences internationalization.
Morgan-Thomas and Bridgewater (2004)	/	Internet application use (DS)	UK	Positive (investment, commitment to the Internet, and firms' existing export sales capabilities) and negative (export experience; firm size; competition) determinants on export success via virtual export channels.
Moen et al. (2008)	/	Information and communication technology (ICT) usage for information search; sales activities; relationship development (DS)	Danish and Norwegian	The relationship of ICT usage-international performance is not significant. ICT usage for sales purposes is limited and apparently negatively associated with the firm's satisfaction with its development of new market knowledge.
Kim et al. (2011)	Resource-based theory	Technological capability (DC)	India	Customer orientation is mediated by the technological capability for consumer relationship management on innovativeness, influencing financial return.
Mathews et al. (2016)	Resource-based theory	Internet marketing capabilities (DC)	Australia	Internet marketing capabilities enhance the firm's ability to generate other internal capabilities (network; information; strategic orientation) within the firm, which in turn promote international market growth.
Tolstoy et al. (2016)	/	Online sales channel adoption (DS)	Sweden	Online sales channel adoption has a positive effect on international sales. The relationship is negatively moderated by geographical export scope.
Gnizy (2019)	/	Big data usage (DS)	Israel	Big data usage enhances international performance through strategic orientations.
Gregory et al. (2019)	Resource-based theory	E-commerce resources (DR) E-commerce capabilities (DC) E-commerce distribution and communication efficiency (DS)	Australia	E-commerce resources promote e-commerce capabilities. E-commerce marketing capabilities directly increase firms' distribution and communication efficiency, which in turn leads to enhanced export venture market performance.
Eid et al. (2020)	Technology acceptance model Innovation diffusion theory	Social media use (DS)	UK	Nonsignificant social media use–performance relationship. Antecedents and advantage mechanisms of the social media use-export performance relationship.
Mahmoud et al. (2020)	Resource-based theory; commitment-trust theory	Social media resources (DR) Relational capabilities (DC) Informational capabilities (DC)	Ghana	Social media resources and digitalized marketing capabilities directly influence export performance; indirectly through commitment and trust.
Liu et al. (2020)	Organizational learning theory	Internet marketing capabilities (DC)	Taiwan	Internet marketing capabilities enhance strategic (market- and entrepreneurial-) oriented behaviors. Knowledge internalization mediates the relationships between market- and entrepreneurial-oriented behaviors and international market performance
Wang (2020)	Dynamic capability theory	Digital marketing capabilities (DC)	China	Digital marketing capabilities contribute positively to export performance. Firms with greater entrepreneurial orientation leverage digital marketing capabilities more effectively and have better performance. Larger firms perform better.
McCormick and Somaya (2020)	Internationalization theory	Internet technologies use (DS)	15 countries	Digital (internet) technologies use is particularly an important factor for exporting by young emerging-economy firms.
Kim and Jean (2021)	Signaling theory	B2B electronic platforms use (DS)	China	E-platforms use positively affects foreign buyer contact, promoting export sales performance. The model is moderated by institutional and export characteristics.
Moon and Jain (2007)	/	Internet marketing activities (DS)	US	Characteristics of the firm, product, channel, and environment influence the degree of internet marketing activities. There is a significant difference in the impact of determinants on export performance between one group of internet marketing activities–internet marketing research, Internet promotion, and Internet product support services, and the other group–Internet product development and Internet distribution.
Jean and Kim (2020)	Resource-based theory	Platform capability (DC) Web capability (DC)	China	Firm internet capability is positively related to export marketing capabilities and export performance. Product complexity and competitive intensity moderate the effects of platform and web capabilities on export marketing capabilities.

Note: DR=digital resources; DC=digital capabilities; DS=digital strategy

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Tolstoy, D., Jonsson, A. and Sharma, D. D. (2016), "The influence of a retail firms geographic scope of operations on its international online sales", *International Journal of Electronic Commerce,* **20**, pp. 293-318.

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APPENDIX C. DATA COLLECTION DETAILS

| Step	Actions	Details
Identification	Manual review of key review articles' references	Reviewed key review articles on EP or digital technology to identify digitalization—EP empirical studies (Chen et al., 2016; Katsikeas et al., 2016).
	Search in electronic databases	Used consistent keywords across all databases and searched in the titles and abstracts of potential studies. Keywords: digitalization, internet, information technology, digital, social media, web 2.0, website, e-commerce, cybersecurity, World Wide Web, in combination with exporting (export, export performance, exporting firms, exporters). Databases: Google Scholar, JSTOR, ProQuest, EBSCO, ScienceDirect, Web of Science.
	Grey literature	Searched conference proceedings such as AIB conference. Posted messages on the ELMAR mailing list calling for additional unpublished studies and data relevant to the meta-analysis.
Screening	Duplicates and irrelevant topics removed	1,796 records screened based on title and abstract. 1,580 records excluded due to being qualitative, not digital-related, not export-focused, or not assessed.
Eligibility	Inclusion Criteria	Firm-Level Examination: Studies must examine the impact of digitalization at the firm level within export settings. Empirical Studies: Only empirical studies are included. Language: Studies must be written in English. Statistical Information: Studies must report statistical information for key relationships that can be converted to effect sizes (i.e., correlation and standardized regression coefficient) (Peterson and Brown, 2005). Time Frame: Only studies conducted after 1990 are included, given the focus on digitalization research post-mid-1990s.
	Exclusion Criteria	Non-Firm-Level Studies: Studies considering the topic at the industry, regional, or country level are excluded. Non-Empirical Studies: Conceptual articles are excluded. Language: Studies not written in English are excluded. Lack of Statistical Information: Studies that do not report statistical information that can be converted to effect sizes (e.g., correlation and standardized regression coefficients) are excluded. Time Frame: Studies conducted before 1990 are excluded. Inappropriate Analytical Methods: Studies using analytical methods not providing effect size or essential values (e.g., ANOVA, T-test) are excluded. Missing Essential Values: Articles missing essential values (e.g., unstandardized regression coefficients) are excluded.
Included	99 studies included	If studies utilize identical firm samples, we treat these as a single sample in our meta-analysis to avoid duplication of data. If a single study includes multiple distinct samples from different countries, we consider these as independent samples, recognizing the unique contexts and potential variability between institutional settings.
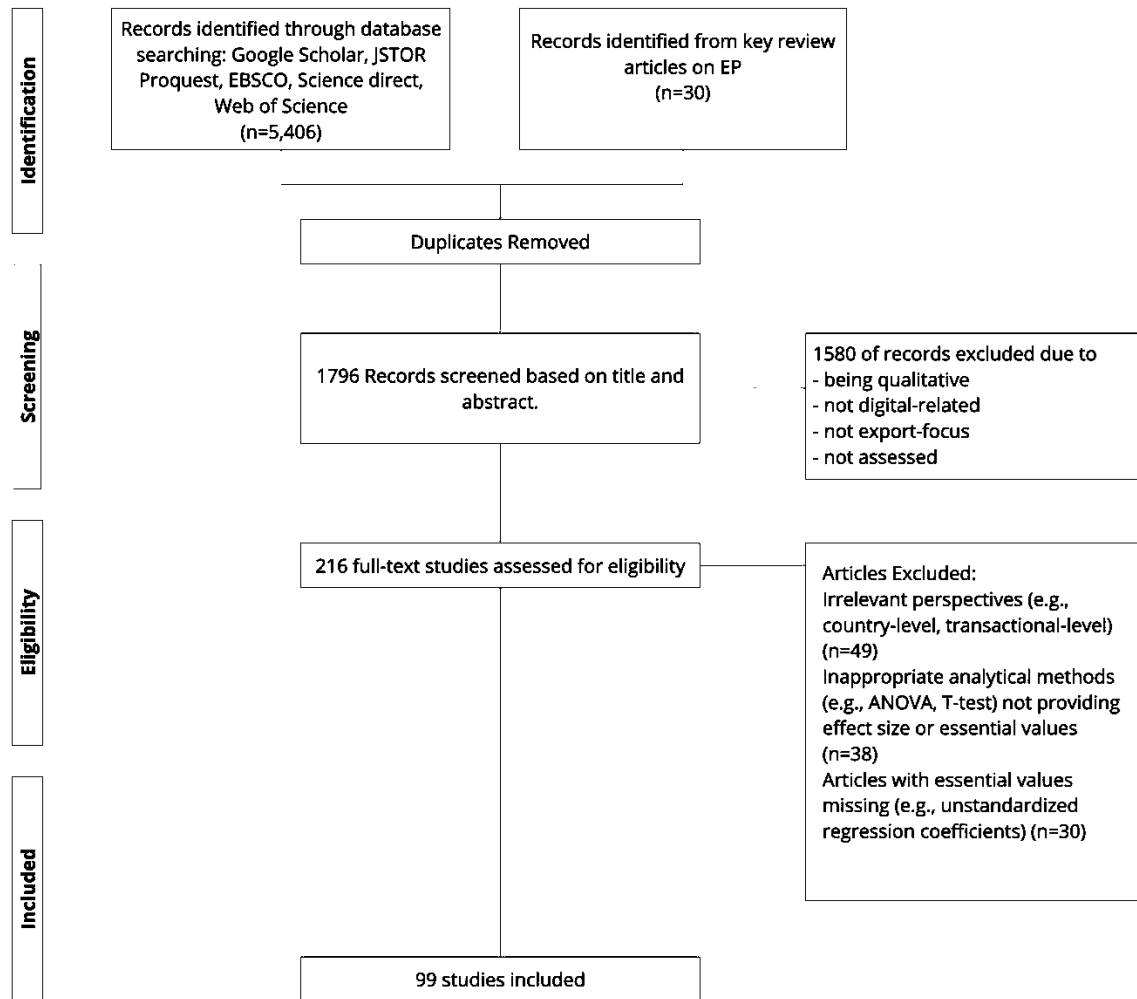
Figure 1. PRISMA process of data collection

APPENDIX D. RESULTS
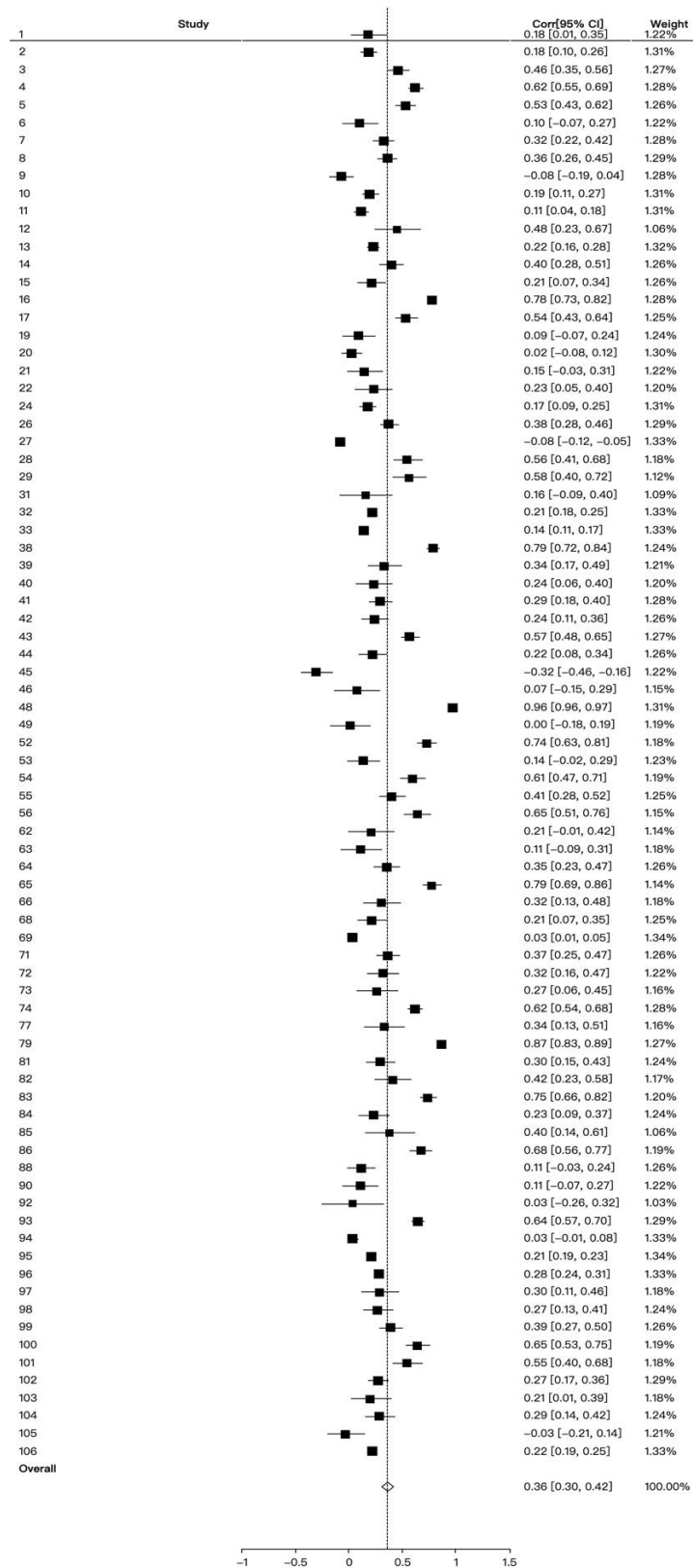
Figure 1. Forest plot of the main effect
Note: Sorted by study number

Table 2. Sensitivity analysis of the digitalization–EP relationship

Study ID	Statistics with study removed	Lower limit	Upper limit	Z-value	p-value
1	0.363	0.303	0.421	11.038	0.000
2	0.364	0.303	0.421	10.984	0.000
3	0.360	0.300	0.417	10.934	0.000
4	0.357	0.297	0.414	10.913	0.000
5	0.359	0.299	0.416	10.917	0.000
6	0.364	0.304	0.421	11.069	0.000
7	0.362	0.302	0.419	10.969	0.000
8	0.361	0.301	0.419	10.955	0.000
9	0.366	0.307	0.423	11.145	0.000
10	0.363	0.303	0.421	10.984	0.000
11	0.364	0.304	0.422	11.008	0.000
12	0.360	0.300	0.417	10.948	0.000
13	0.363	0.302	0.421	10.925	0.000
14	0.361	0.301	0.418	10.953	0.000
15	0.363	0.303	0.420	11.019	0.000
16	0.354	0.295	0.410	10.956	0.000
17	0.359	0.299	0.416	10.913	0.000
19	0.364	0.304	0.422	11.072	0.000
20	0.365	0.305	0.423	11.084	0.000
21	0.364	0.304	0.421	11.052	0.000
22	0.363	0.303	0.420	11.022	0.000
24	0.364	0.303	0.421	10.991	0.000
26	0.361	0.301	0.419	10.950	0.000
27	0.367	0.307	0.424	11.125	0.000
28	0.359	0.299	0.416	10.908	0.000
29	0.358	0.298	0.416	10.902	0.000
31	0.363	0.303	0.420	11.053	0.000
32	0.363	0.302	0.422	10.756	0.000
33	0.364	0.302	0.423	10.667	0.000
38	0.354	0.294	0.411	10.851	0.000
39	0.362	0.301	0.419	10.983	0.000
40	0.363	0.303	0.420	11.020	0.000
41	0.362	0.302	0.419	10.981	0.000
42	0.363	0.303	0.420	11.008	0.000
43	0.358	0.298	0.415	10.908	0.000
44	0.363	0.303	0.420	11.016	0.000
45	0.369	0.309	0.426	11.268	0.000
46	0.364	0.304	0.422	11.084	0.000
48	0.341	0.295	0.385	13.786	0.000
49	0.365	0.305	0.422	11.109	0.000
52	0.355	0.295	0.413	10.840	0.000
53	0.364	0.304	0.421	11.053	0.000
54	0.358	0.298	0.415	10.890	0.000
55	0.361	0.301	0.418	10.954	0.000

56	0.357	0.297	0.415	10.872	0.000
62	0.363	0.303	0.420	11.034	0.000
63	0.364	0.304	0.421	11.067	0.000
64	0.361	0.301	0.419	10.968	0.000
65	0.354	0.294	0.412	10.810	0.000
66	0.362	0.302	0.419	10.994	0.000
68	0.363	0.303	0.420	11.020	0.000
69	0.365	0.302	0.426	10.475	0.000
71	0.361	0.301	0.419	10.963	0.000
72	0.362	0.302	0.419	10.986	0.000
73	0.362	0.302	0.420	11.013	0.000
74	0.357	0.298	0.415	10.914	0.000
77	0.362	0.301	0.419	10.989	0.000
79	0.351	0.292	0.407	10.986	0.000
81	0.362	0.302	0.419	10.992	0.000
82	0.361	0.300	0.418	10.959	0.000
83	0.355	0.295	0.412	10.841	0.000
84	0.363	0.303	0.420	11.014	0.000
85	0.361	0.301	0.418	10.975	0.000
86	0.357	0.296	0.414	10.862	0.000
88	0.364	0.304	0.421	11.058	0.000
90	0.364	0.304	0.421	11.067	0.000
92	0.364	0.305	0.422	11.095	0.000
93	0.357	0.297	0.414	10.920	0.000
94	0.365	0.305	0.423	10.977	0.000
95	0.363	0.298	0.426	10.110	0.000
96	0.362	0.301	0.421	10.785	0.000
97	0.362	0.302	0.419	11.000	0.000
98	0.362	0.302	0.420	11.001	0.000
99	0.361	0.301	0.418	10.955	0.000
100	0.357	0.297	0.414	10.873	0.000
101	0.359	0.299	0.416	10.909	0.000
102	0.362	0.302	0.420	10.978	0.000
103	0.363	0.303	0.420	11.033	0.000
104	0.362	0.302	0.419	10.995	0.000
105	0.366	0.306	0.423	11.124	0.000
106	0.363	0.301	0.422	10.632	0.000
Random	0.361	0.302	0.418	11.052	0.000
Pred Int	0.361	-0.214	0.750	0.000	0.000

APPENDIX E. STUDIES OF THE META-ANALYSIS REVIEWED

Sample ID	Authors	Sample region	Sample size	Digitalization term	Publication status
1	Jean and Kim (2020)	China	130	DC	Published
2	Lecerf and Omrani (2020)	German	612	DS	Published
3	Racela and Thoumrungroje (2020)	Thai	239	MIX	Published
4	Santoso et al. (2020)	Indonesia	301	DS	Published
5	Mahmoud et al. (2020)	Ghana	210	MIX	Published
6	Liu et al. (2020)	Taiwan	132	MIX	Published
7	Pergelova et al. (2019)	Bulgaria	300	DS	Published
8	Gregory et al. (2019)	Australia	340	MIX	Published
9	Eid et al. (2019)	UK	277	DS	Published
10	Tolstoy et al. (2016)	Swedish	562	DS	Published
11	Morgan-Thomas and Bridgewater (2004)	UK	705	MIX	Published
12	Lal (2004)	India	51	DS	Published
13	Davis and Harveston (2000)	US	982	DS	Published
14	Bianchi and Mathews (2013)	Chile	204	MIX	Conference paper
15	Radzi et al. (2015)	Malaysia	200	DS	Published
16	Al-Zyoud (2018)	Jordan	313	DC	Published
17	Tavassoli and Naami (2020)	Iran	179	DC	Published
18	Al-Dmour et al. (2008)	Jordan; Italy	150		Published
19	Mostafa and Hussein (2003)	UK	158	DS	Doctoral thesis
20	Ling-yee (2010)	China	414	MIX	Published
21	Winklhofer et al. (2006)	UK	130	MIX	Published
22	Šimić et al. (2019)	Croatia	111	DS	Published
23	Sürer and Mutlu (2015)	Turkey	144	MIX	Published
24	Raymond et al. (2015)	Canada	588	DS	Published
25	Nguyen and Barrett (2006)	Vietnam	144		Published
26	Blazquez and Domenech (2018)	Spain	350	DR	Published
27	Bertschek and Fryges (2002)	German	3026	DR	Working paper
28	Peña-Vinces et al. (2012)	Peru	100	DS	Published
29	Ekemen and Bayram (2014)	North Cyprus	70	DS	Published
30	Kim and Cavusgil (2020)	China	273	DS	Published
31	Hinson and Sorensen (2006)	Ghana	60	DS	Published
32	Cassetta et al. (2020)	Italy	2516	DS	Published
33	McCormick and Somaya (2020)	15 countries	3733	DR	Published
34	Chulikavit (2003)	US	10		Published
35	Chulikavit (2003)	Thai	15		Published
36	Jeong (2016)	KOREA	484		Published
37	Serrano and Acero (2015)	Spain	177		Published
38	Choi (2012)	China	158	MIX	Published
39	Cho (2004)	US, Korea	123	DS	Doctoral thesis
40	Sinkovics et al. (2013)	UK	115	MIX	Published
40	Pezderka et al. (2012)	UK	115	MIX	Published
41	Wang et al. (2011)	Taiwan	275	DC	Published

42	Moon and Jain (2007)	US	208	DS	Published
43	Bianchi et al. (2017)	Chile	233	MIX	Published
44	Glavas et al. (2017)	Australia	208	DC	Published
45	Gurău and Merdji (2008)	UK/US/Australia	138	DS	Published
46	Hajidimitriou and Azaria (2009)	Greece	80	DR	Conference paper
47	Lee and Falahat (2019)	Malaysia	143		Published
48	Moen et al. (2008)	Norway; Denmark	635	DC	Published
49	Raymond et al. (2005)	Canada	108	MIX	Published
50	Arslandere et al. (2020)	turkey	174		Published
51	Au Yong Hui et al. (2018)	Malaysia	97		Published
52	Aziz and Omar (2013)	Malaysia	101	DC	Published
53	Cano and Baena (2015)	Spain	155	DS	Published
54	Firouzeh and Satvati (2018)	Iran	109	MIX	Published
55	Yeoh (2000)	US	180	DS	Published
56	Naglic et al. (2020)	Slovenia	81	DS	Published
57	Rialp-Criado et al. (2020)	Spain	337		Published
58	Rialp-Criado et al. (2020)	Spain	226		Published
59	Rialp-Criado et al. (2020)	Spain	111		Published
60	Rialp-Criado et al. (2020)	Spain	139		Published
61	Rialp-Criado et al. (2020)	Spain	198		Published
62	Albertos et al. (2014)	Greece	77	MIX	Conference paper
63	Bahrainizadeh et al. (2015)	Iran	98	DS	Published
64	Beckers et al. (2007)	Dutch	200	DS	Conference paper
65	Kabiri (2014)	Iran	76	DS	Published
66	Rahmadani et al. (2020)	Indonesia	100	DC	Published
67	Li et al. (2010)	China	307		Published
67	Bell et al. (2012)	China	307		Published
68	Gnizy (2019)	Israel	187	DS	Published
69	Eduardsen (2018)	34 EU countries	14513	DS	Book chapter
70	Tan (2019)	China	115		Published
71	Mathews et al. (2016)	Australia	224	DC	Published
72	Mathews et al. (2012)	Australia	137	MIX	Published
73	Mathews et al. (2012)	Australia	87	MIX	Published
74	Nguyen and Barrett (2006b)	Vietnam	306	DS	Published
74	Nguyen (2007)	Vietnam	306	DS	Published
75	Mathews et al. (2015)	Taiwan	130	DC	Published
76	Payakkapong et al. (2017)	Thai	345	DS	Published
77	Subrahmanya (2017)	India	85	DS	Published
78	Zhou (2014)	Chile	1033	DS	Published
79	Kuhlmeier (2005)	US	261	DS	Doctoral thesis
80	Kim et al. (2011)	India	154	DC	Published
81	Erum et al. (2017)	Pakistan	169	DS	Published
82	Putra and Hasibuan (2015)	Indonesia	90	DS	Conference paper
83	Vătămănescu et al. (2017)	Europe	118	DS	Published

84	Wang (2020)	China	167	DC	Published
85	Zhang (2005)	US	51	DC	Doctoral thesis
86	Zhang (2005)	China	106	DC	Doctoral thesis
86	Zhang et al. (2008)	China	99	DC	Published
87	Gbadegeshin et al. (2019)	Nigeria	265		Published
88	Kim et al. (2021)	China	205	MIX	Published
89	Robles-Estrada et al. (2016)	Mexican	235		Published
90	Lu and Julian (2005)	Australia	133	DS	Conference paper
91	Alarcón-del-Amo et al. (2016)	Spain	152		Published
92	Ueasangkomsate (2015)	Thai	46	DS	Conference paper
93	Al-Khatib (2023)	Jordan	327	DC	Published
94	Altinkaya et al. (2024)	turkey	1650	DS	Published
95	Babasanya et al. (2024)	40 SSA countries	9001	DS	Published
96	Ballerini et al. (2023)	Italy	2186	DS	Published
97	Elia et al. (2021)	Italy	102	DS	Published
98	Hultman et al. (2023)	Kazakhstan	169	DS	Published
99	Ipsmiller et al. (2022)	Australia	213	DS	Published
100	Luu (2023)	Vietnam	107	MIX	Published
101	Luu (2024)	Vietnam	96	MIX	Published
102	Mahmoud et al. (2023)	Ghana	369	DR	Published
103	Tolstoy et al. (2022)	Swedish	99	DC	Published
104	Trąpczyński and Kawa (2023)	Poland	165	DS	Published
105	Zahoor and Lew (2023)	Pakistan	129	DS	Published
106	Dong et al. (2024)	China	3641	DR	Conference paper

Notes: DR=digital resources; DC=digital capabilities; DS=digital strategy; MIX=the study includes more than one types of digitalization variable.

For blank digitalization term cells, we retained studies that did not report digitalization-EP related effect sizes, as they were still relevant to our topic and were remained for calculating other effect sizes, such as the antecedents of digitalization.