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A meta-analysis of the performance effects of supply chain digitalization: toward a value-oriented perspective

Anni Rajala[a,*], Hannu Makkonen[a]

[a] University of Vaasa, P.O Box 700, FIN-65101 Vaasa, Finland

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ABSTRACT

Supply chain digitalization (SCD), the integration of digital technologies into supply chain activities, has become a central driver of transformation in contemporary supply chain management. Despite substantial scholarly attention, empirical evidence on the performance effects of SCD remains fragmented and at times contradictory. This study addresses this inconsistency by developing and testing a value-oriented perspective that distinguishes between digital technologies that foster value creation, generating benefits for customers and partners, and those focused on value capture to retain and exploit those benefits within the firm. This meta-analysis of 73 empirical studies identifies six value-creation themes and four value-capture themes, each associated with distinct digital technologies and supply chain functions. The results show that value-creation-oriented technologies are predominantly linked to innovation outcomes and supply chain performance, whereas value-capture-oriented technologies exhibit stronger associations with both competitive performance and supply chain performance. By disentangling these underlying mechanisms, the study clarifies when and how SCD contributes to performance and offers actionable guidance for aligning digitalization initiatives with strategic objectives in supply chains.

1. Introduction

Supply chain digitalization (SCD) encompasses the integration of digital technologies into supply chain activities and has become a focal point of contemporary supply chain management (SCM) research (Björkdahl, 2020; Frank, Dalenogare, & Ayala, 2019; Liao, Deschamps, Loures, & Ramos, 2017). The surge in scholarly interest reflects SCD's transformative potential to optimize core activities such as demand forecasting, cost reduction, and interorganizational coordination (Deepu & Ravi, 2023; Martín-Peña, Sánchez-López, & Díaz-Garrido, 2020; Perano et al., 2023). These advances are widely expected to drive improvements to financial (Ali, Gongbing, & Mehreen, 2020; Y. Li, Dai, & Cui, 2020), operational (Ganbold, Matsui, & Rotaru, 2021; Y. Yu, Huo, Zhang, & Justin)., 2021), and innovation (Chi, Wang, Lu, & George, 2018) performance. Nevertheless, empirical evidence remains mixed: while some studies confirm these benefits, others report inconsistent or negligible effects (e.g., Nasiri, Ukko, Saunila, & Rantala, 2020; Rajala & Hautala-Kankaanpää, 2023). This discrepancy signals a need to clarify the conditions under which SCD influences supply chain performance. One possible explanation for these mixed findings is the failure to account for the different purposes for which digital technologies are applied. In this regard, the current research builds on the fundamental distinction between value creation and value-capture mechanisms to examine whether these two fundamentally different use contexts, deploying SCD to create value or to capture value, have divergent outcomes.

Value creation and value capture are central concepts in both SCM and strategic management (Lepak, Smith, & Taylor, 2007; McIntyre, Wilson, & Childerhouse, 2023; Minerbo, Kleinaltenkamp, & Brito, 2021; Ramsay, 2005). In the supply chain context, value creation refers to activities that generate value and benefits for customers, partners, and society. In contrast, value-capture concerns how firms retain and exploit benefits to safeguard profitability and long-term viability. This distinction provides a powerful framework for categorizing supply chain processes and examining how digital technologies facilitate them. Specifically, firms may deploy digital technologies to enhance value-creation activities, such as product design, production, and customer engagement, or to strengthen value-capture mechanisms, such as pricing strategies, financial control, and transactional efficiency. This value-oriented perspective moves beyond the traditional

* Corresponding author.
E-mail addresses: anni.rajala@uwasa.fi (A. Rajala), hannu.makkonen@uwasa.fi (H. Makkonen).

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operational–strategic dichotomy that has long shaped SCM research (Melnyk, Davis, Spekman, & Sandor, 2010). While operational and strategic activities are typically distinguished by their impact or temporal scope (short-term vs. long-term) (Minerbo et al., 2021), value creation and capture relate more directly to how value flows are generated and retained across the supply chain. Moreover, digital technologies often blur the distinction between operational and strategic categories. For instance, tools for demand forecasting or dynamic pricing may appear operational but can yield strategic advantages. Nevertheless, despite the growing interest in SCD reflected in studies on digital tool implementation (Deepu & Ravi, 2023), business process frameworks (Perano et al., 2023), and Industry 4.0 transformations (Liao et al., 2017; Zekhnini, Cherrafi, Bouhaddou, Benghabrit, & Garza-Reyes, 2020), there remains little research on how digital technologies enable distinct value creation and value-capture mechanisms within supply chains and how they impact performance outcomes. To address these gaps, we pose two core research questions:

RQ1. : How can SCD be systematically conceptualized in terms of value creation and value-capture mechanisms?

RQ2. : How do the value creation and value capture facilitated by SCD influence performance outcomes across different performance types?

This study employs a mixed-method research design combining content analysis and meta-analysis to address these research questions. Drawing on established theoretical frameworks (e.g., Deepu & Ravi, 2023; McIntyre et al., 2023; Minerbo & Brito, 2022), we categorized the digitalization focus of each study into one of two overarching value mechanisms, value creation or value capture, which were further disaggregated into three functional categories per mechanism, resulting in a six-part coding scheme. Analysis of the articles identified ten specific themes illustrating how digital technologies support different supply chain functions across these value processes. These nuanced themes enabled a more targeted meta-analysis, allowing us to examine how different digitalization emphases are associated with varying performance outcomes. The meta-analysis encompasses 73 empirical studies that reported correlations between SCD-related and performance-related variables in interorganizational supply chains. Its results reveal a positive association between digitalization and performance overall. However, effect sizes varied across value types: digitalization initiatives linked to value creation generated more consistent and stronger performance outcomes than those focused on value capture. By combining content-driven insights with statistical synthesis, the study offers both empirical generalization and conceptual refinement, contributing to a more structured understanding of how digital technologies create and capture value in supply chains.

This research provides three main contributions. First, building on recent research highlighting the strategic significance of SCD (e.g., Deepu & Ravi, 2023; Perano et al., 2023), we introduce a value-oriented **perspective** that positions SCD as a key enabler of both value creation and value capture. While the value creation and capture concepts are well-established in supply chain research (Lepak et al., 2007; Minerbo & Brito, 2022; Ramsay, 2005), their application to SCD remains underexplored and lacks systematic analysis. To address this gap, we define value creation in SCD as the generation of benefits and opportunities for customers and partners through the effective use of digital technologies, tools, and data in supply chain processes. Similarly, value capture in SCD refers to the realization and retention of benefits from digitalization initiatives within a firm (Deepu & Ravi, 2023; McIntyre et al., 2023; Minerbo & Brito, 2022; Perano et al., 2023).

Second, our study proposes a framework disaggregating value creation and value-capture mechanisms into three functional categories. We build on insights from the literature to classify these categories into six themes: supply chain platformization, interface enhancement, capabilities development, collaboration enablement, data-driven business development, and strategic transformation. Each theme is associated with specific digital tools and technologies that enable the functions. In parallel, we identify four themes of value capture: digital traceability, transaction process digitization, operational efficiency and cost control, and infrastructure between systems and actors; again, each is supported by relevant digital solutions. By linking digital technologies to these distinct value-creation and value-capture mechanisms, we provide a structured and nuanced conceptualization that clarifies how digitalization functions across supply chain activities.

Third, we conduct a meta-analysis to reconcile contradictory findings in the SCD-performance literature (Nasiri et al., 2020; Paolucci, Pessot, & Ricci, 2021). Our results reveal that digital technologies supporting value creation and value capture generate distinct performance outcomes. Technologies supporting value creation, such as predictive analytics, IT-enabled collaboration, and platforms for joint decision-making, primarily enhance supply chain and innovation outcomes. The strongest impacts result from supply chain interface enhancement and the development of capabilities. In contrast, technologies designed for value capture, including blockchains, e-business tools, and trade digitization, are primarily geared toward digital traceability and infrastructure between systems and actors, thereby driving competitive and supply chain performance. Notably, digital traceability technologies spur the most significant performance effects among value-capture mechanisms. This synthesis provides actionable insights for managers seeking to optimize digital investments and enhance supply chain performance.

The remainder of the paper is structured as follows. The next section elaborates on the concepts of value creation and capture, particularly in the context of SCD. Section three outlines the research design and methods of the qualitative content analysis and meta-analysis. Section four presents the empirical findings. The final section discusses theoretical and managerial implications and offers avenues for future research.

2. Theoretical background

2.1. Toward a collaborative perspective on value creation and capture in the supply chain

Much of the research on value creation and capture has been conducted within the domains of strategic management and innovation (Chesbrough, Lettl, & Ritter, 2018; Pisano & Teece, 2007), primarily adopting a market- and competition-based perspective. Accordingly, research has focused on how suppliers innovate and introduce new products or services offering value to customers and other market actors. The suppliers hope to retain a sufficient share of the value generated to prevent practice drifting away from the original intentions, a scenario known as *value slippage* (Lepak et al., 2007). This perspective aligns with a value-in-exchange approach (Vargo & Lusch, 2008), where value is created by the supplier, embedded in products or services, and subsequently delivered to the market to be monetized (Chesbrough et al., 2018; Minerbo et al., 2021). Within this framework, value capture is conceptualized as the supplier's ability to monetize its innovations or otherwise derive competitive benefits from them.

Furthermore, value creation and capture have offered a robust framework for prior research on interorganizational interactions in supply chain research (Cox, 2004; Kähkönen, Lintukangas, & Hallikas, 2015; Lepak et al., 2007; McIntyre et al., 2023; Minerbo & Brito, 2022; Ramsay, 2005). The supply chain process consists of a sequence of value creation and capture activities that transform raw materials into finished products, ensuring that customer needs and expectations are met at every stage. Each phase of the process and each participant contributes to enhancing the perceived value of a product or service to downstream partners and end customers. In this context, value creation and value capture are intertwined concepts, focusing on the generation of outputs and ensuring these outputs fulfill their intended purpose in ways that benefit both users and suppliers. As such, value creation and capture extend beyond the mere division of costs and benefits, emphasizing the importance of collaboration in creating and capitalizing on benefits to maximize total value for all actors involved (Makkonen, Saarikorpi, & Rajala, 2019). Therefore, while SCM research draws on insights from strategic management and innovation, it emphasizes the interconnected nature of supply chain actors and their joint contributions to value creation and capture (McIntyre et al., 2023). Studies of SCM adopt a *value-in-use* perspective, which contrasts with the *value-in-exchange* approach. Rather than viewing value as solely embedded in products or services and monetized upon market exchange, the value-in-use perspective considers value to be co-created and realized during usage (Vargo & Lusch, 2008).

From a value-in-use perspective, value creation involves transforming inputs into outputs that produce benefits for both end customers and other actors across the supply chain, including the firm itself. Accordingly, value capture is inherently connected with value creation, as the realization of value by one actor often depends on value being co-created and shared among others. The relational and systemic nature of value creation and capture is central to the value-in-use perspective and provides a useful foundation for understanding the role of digitalization in supply chains. The following section examines how digital technologies enable value processes and introduces a framework for articulating areas of SCD through the dual lens of value creation and value capture.

2.2. Supply chain digitalization and value creation and capture

The adoption of digital technologies is critical to interorganizational supply chain operations, facilitating real-time information exchange, seamless data flows, and enhanced collaboration among business partners (Chi et al., 2018; Deepu & Ravi, 2023; Gawankar, Gunasekaran, & Kamble, 2020). Digital platforms provide a structured foundation for collaboration, enabling firms to leverage big data, artificial intelligence (AI), and machine learning to optimize decision-making and operational efficiency (Cenamor, Parida, & Wincent, 2019). Similarly, cloud-based supply chain integration is a strategic enabler, aiding firms seeking to leverage their internal resources and enhance connectivity across their supply chain networks (Shee, Miah, Fairfield, & Pujawan, 2018). However, the value derived from SCD is not solely a function of technological capabilities. Instead, it depends on the effective organization and integration of digital technologies into business processes to maximize the potential benefits (Björkdahl & Holmén, 2019; Cappa, Oriani, Peruffo, & McCarthy, 2021; Perano et al., 2023).

In this study, we propose that value creation and value capture provide a useful framework for categorizing the business processes to be

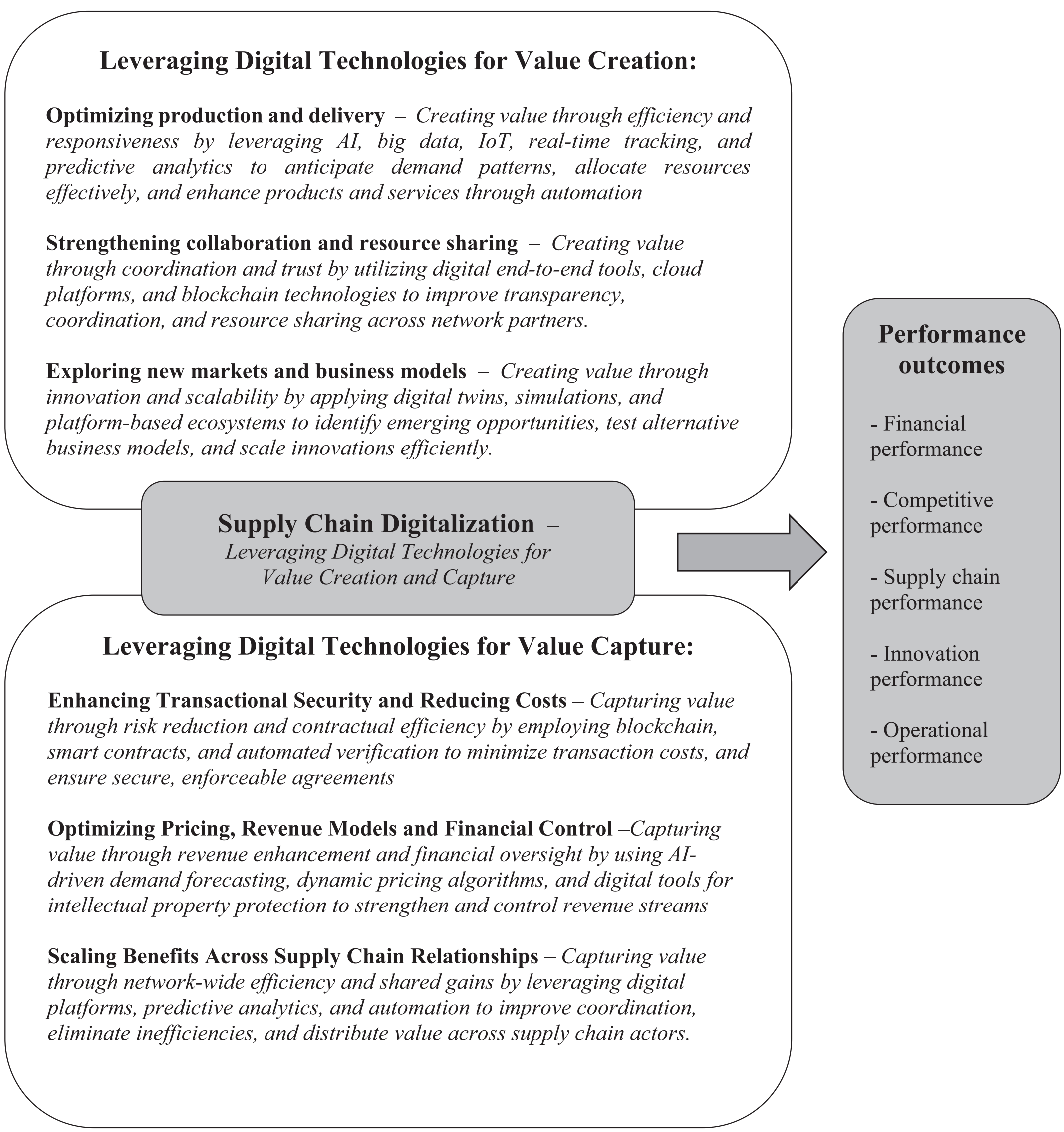

Fig. 1. Analytical framework for leveraging digital technologies for value creation and capture.

digitized (Björkdahl & Holmén, 2019; Klingenberg, Júnior, & J. A., & Müller-Seitz, G., 2022; McIntyre et al., 2023; Minerbo et al., 2021). Fig. 1 presents a framework that delineates the areas of digitalization in terms of value creation and value capture within the supply chain.

In the upper section of our framework, we conceptualize SCD supporting value creation through three overarching categories that reflect and organize diverse perspectives in the literature. The first, *optimizing production and delivery*, refers to the use of AI, big data, and predictive analytics to enhance efficiency and responsiveness by anticipating demand, optimizing resource allocation, and enabling automation and real-time tracking (Chi et al., 2018; Gawankar et al., 2020; Shee et al., 2018). The second, *strengthening collaboration and resource-sharing*, emphasizes the role of digital end-to-end tools, cloud platforms, and blockchains in improving coordination, transparency, and shared innovation among supply chain partners—supporting capabilities such as collaborative design, predictive maintenance, and dynamic resource allocation (Björkdahl & Holmén, 2019). The third category, *exploring new markets and business models*, involves the use of digital twins, simulation technologies, and platform-based ecosystems to identify emerging opportunities, test novel business models, and scale innovations efficiently, and spans data-driven services to circular economy initiatives (Cappa et al., 2021; Perano et al., 2023). These categories help structure the growing body of literature on the benefits of SCD and highlight how digital technologies facilitate firms shifting from reactive, cost-focused strategies toward more proactive, adaptive, and innovation-driven approaches. The ability to extract actionable insights from vast data sources is transforming decision-making and positioning firms to co-create value with customers and partners in increasingly dynamic environments (Cenamor et al., 2019). Ultimately, digitalization enables supply chains to function not just as logistical systems, but as agile ecosystems aligned with evolving customer expectations and market demands (Klingenberg et al., 2022; McIntyre et al., 2023).

The lower section of our framework defines value capture through three overarching categories that reflect how digital tools help firms retain, control, and distribute value equitably. The first approach, *enhancing transactional security and reducing costs*, involves capturing value through risk reduction and contractual efficiency by utilizing technologies such as blockchains, smart contracts, and automated verification to prevent fraud, lower transaction costs, and ensure secure and enforceable agreements. These tools not only streamline exchanges across actors but also establish the trust and transparency needed for digital supply chains to function effectively (S. Zhang, Yu, Wan, Cao, & Huang, 2024). The second, *optimizing pricing, revenue models, and financial control*, refers to capturing value through revenue enhancement and tighter financial oversight. Firms using AI-driven analytics, dynamic pricing algorithms, and digital tools to protect intellectual property can forecast demand more accurately than previously, adopt and refine dynamic pricing, and safeguard intangible assets, all of which reinforce their ability to extract financial value from digital operations and manage it (Perano et al., 2023). The third, *scaling benefits across supply chain relationships*, focuses on capturing value through network-wide efficiency and shared gains by leveraging digital platforms, predictive analytics, and automation to reduce inefficiencies, improve coordination, and ensure that benefits are equitably distributed among interconnected actors. Real-time data sharing and advanced monitoring tools support transparent value flows, secure agreements, and mitigate power asymmetries in profit-sharing mechanisms (McIntyre et al., 2023). The above categories highlight how value capture in SCD aims to do more than maximize firm-level returns; the goal is to transform digital advancements into measurable and enduring gains across the entire supply chain ecosystem.

Moreover, it is essential to distinguish different types of performance outcomes to fully understand the impact of SCD on firm performance. Our analytical framework follows prior research in defining the performance outcomes of utilizing digital technologies in value creation and value capture. Accordingly, we assume SCD will impact financial, competitive, supply chain, innovation, and operational performance (Fig. 1). Financial performance remains a key metric, often assessed through profitability, cost savings, and return on investment. Further, competitive performance reflects how well a firm positions itself in the market relative to rivals. Here, the advantages derived from SCD include enabling data-driven decision-making, rapid responses to market shifts, and stronger customer engagement, contributing to improved competitive positioning (Cenamor et al., 2019; Mora-Monge, Fatoki, Arslan, & Rauniar, 2023). Supply chain digitalization also affects other performance dimensions that reflect broader organizational and relational capabilities. Supply chain performance refers to the efficiency, integration, and resilience of supply chain activities; it can be enhanced through improved real-time information sharing, collaboration, and coordination (Q. Yang, Wang, & Zhao, 2019; Zelbst, Yang, Green, & Sower, 2024). Operational performance focuses on internal process efficiency, quality, and productivity gains, often resulting from automation, AI, or other digital process innovations (Rajala & Hautala-Kankaanpää, 2023). Innovation performance, in turn, captures a firm's ability to employ digital tools to produce new products, services, or business models, alongside its capacity to foster collaborative innovation with partners (Hensen & Dong, 2020; Zhang, Chen, Zhang, & Liu, 2023). The next section reviews the previous research on SCD and firm performance.

2.3. Supply chain digitalization and firm performance

Research has often explored the relationship between SCD and firm performance, yet the resulting findings remain mixed. While some studies highlight the positive impact of digitalization on firm performance (Finger, Flynn, & Paiva, 2014; Wamba et al., 2017), others suggest that the adoption of digital technologies does not necessarily lead to immediate improvements in performance (Cenamor et al., 2019; G. Li, Yang, Sun, & Sohal, 2009). For example, Nasiri et al. (2020) concluded that digital technologies alone do not produce positive performance effects. Similarly, Rajala and Hautala-Kankaanpää (2023) demonstrated that digital technologies do not directly improve performance. However, Pattanayak and Punyatoya (2020) found that adopting digital technologies did have a strong positive impact on performance. These inconsistent findings among prior studies might be related to the significant investments required to pursue digitalization; firms must integrate new technologies into existing supply chain operations without guaranteed short-term returns (Yunis, Tarhini, & Kassar, 2018). Furthermore, prior studies have focused on different performance outcomes, such as financial performance (e.g., Gawankar et al., 2020; Patil et al., 2024), competitive performance (e.g., Cenamor et al., 2019; Mora-Monge et al., 2023), operational performance (e.g., Enrique et al., 2022; Rajala & Hautala-Kankaanpää, 2023), innovation performance (e.g., Hensen & Dong, 2020; M. Zhang et al., 2023), and supply chain performance (e.g., Q. Yang et al., 2019; Zelbst et al., 2024). Therefore, the inconsistencies may also relate to different performance outcomes, because performance can be measured at the organizational level (e.g., financial performance or innovation performance) or that of the relationship (e.g., supply chain performance).

As discussed above, SCD facilitates access to real-time information, enhances collaboration, and strengthens overall SCM (Cenamor et al., 2019; G. Li et al., 2009). Digitalization allows firms to leverage external information to respond effectively to market shifts and emerging opportunities (Neirotti & Raguseo, 2017). However, the ability of firms to leverage digital technologies will vary, particularly in terms of whether they use them primarily for value creation or value capture. This distinction may help explain the varying effects of SCD on firm performance.

From a value-capture perspective, profitability is the primary metric of firm performance, as it reflects the extent to which a firm retains the value generated within the supply chain (Bowman & Ambrosini, 2000).

Digital technologies enhance transactional security, pricing strategies, and financial control, ultimately improving financial performance (Brinch, 2018; Klingenberg et al., 2022). For example, firms using digital platforms to manage supply relationships can capture value more effectively by optimizing service delivery and contract enforcement. Similarly, leveraging big data analytics for demand forecasting and operational efficiency strengthens competitiveness and cost control, directly influencing profitability (Brinch, 2018).

While value creation occasioned by digitalization may not always immediately boost financial performance, it can enhance other types of performance, such as innovation, agility, and market competitiveness (Björkdahl & Holmén, 2019). For example, digital platforms, automation, and AI-driven insights can streamline processes, reduce inefficiencies, and facilitate business model innovation, which offers long-term strategic advantages (Agarwal, Simonsson, Magnusson, Hald, & Johanson, 2022; Porter & Heppelmann, 2014). Furthermore, value co-creation through digital tools fosters new forms of collaboration and knowledge exchange across supply chain networks, potentially enhancing innovation performance (Fosso Wamba, Akter, Coltman, Ngai, & E., 2015; Schilling & Seuring, 2022).

In summary, while value-capture activities, such as revenue optimization, cost efficiency, and competitive positioning, are more directly associated with financial performance, value-creation efforts underpin broader performance dimensions, including market adaptability, customer satisfaction, and innovation. However, these two mechanisms are not isolated; their effects are often intertwined. For instance, enhanced customer satisfaction (a value-creation outcome) may lead to increased revenue (a value-capture outcome), and cost efficiencies may free up resources for innovation. These interdependencies suggest that studies focusing on one dimension without accounting for the other may be overlooking important performance dynamics. Research that unveils the distinct yet interrelated effects of value creation and value capture through SCD offers a more comprehensive explanation of the mixed empirical findings on digitalization and firm performance.

3. Method

3.1. The research design: qualitative content analysis and meta-analysis

This study employs a mixed-method approach, combining qualitative content analysis and meta-analysis to investigate the relationship between SCD and performance. First, we conducted a literature search to identify relevant studies. We set two inclusion criteria for studies to move forward to content analysis and meta-analysis: (1) a focus on interorganizational supply chain operations, and (2) reporting a correlation between a digitalization-related and a performance-related variable.

After identifying relevant studies, we conducted a directed qualitative content analysis (Hsieh & Shannon, 2005; Krippendorff, 2018). The aim was to reinforce the interpretation of the meta-analytic results and account for the diverse ways in which digital technologies are applied. Based on established theoretical frameworks (e.g., Deepu & Ravi, 2023; McIntyre et al., 2023; Minerbo & Brito, 2022) and our analytical framework (Fig. 1), we classified each study according to whether it addressed value creation or value capture in the supply chain. These two overarching mechanisms were each further disaggregated into three functional categories, resulting in a six-part coding scheme to guide analysis (see Fig. 1). We first coded the studies into those categories and then analyzed them inductively to identify ten empirically grounded themes reflecting specific technological applications and supply chain functions.

Finally, a meta-analysis was conducted. Meta-analysis of correlations is a well-established method for synthesizing empirical findings and enables the systematic analysis of the variations in independent and dependent variables to support theory development (Schmidt & Hunter, 2015). Analyzing such variations can be framed as akin to comparing apples and oranges and is considered a limitation of the method. Nevertheless, it is also a strength: meta-analysis emphasizes the underlying phenomenon (i.e., the fruit) rather than differences in measurement (i.e., whether the fruit is apples or oranges). In this study, the fruit is the relationship between SCD and performance, both of which encompass a range of constructs and contexts. A meta-analysis thus makes it possible to conduct a comprehensive examination of that relationship regardless of the heterogeneity among studies. Together, the combination of content analysis and meta-analytic synthesis facilitated testing the relationship between SCD and performance quantitatively while developing a refined, empirically grounded understanding of how digitalization contributes to value creation and value capture in supply chains.

3.2. Literature search and study selection

First, we conducted a systematic literature search in the Scopus database using a combination of keywords, including: "digitalization," "digital transformation," "digit*," "supply chain digit*," "information integration," "supply chain integration," "performance," "efficiency," and "productivity." These keywords were carefully selected to identify studies that examine the application of digital technologies within supply chain operations and their relationship to performance outcomes. The terms formed comprehensive search criteria intended to capture the breadth of SCD and its performance implications. We deliberately excluded terms related to value from the search strategy (e.g., "value-in-use," "value creation," and "value capture"), as our study adopts value creation and value capture as theoretical lenses rather than phenomena to be empirically isolated in the dataset. We applied two inclusion criteria: (1) examining at least one digitalization-related variable and one performance-related variable, and (2) an empirical focus on interorganizational operations. Consequently, we excluded studies that focused solely on intra-organizational processes or that lacked either a digitalization or performance dimension. These criteria ensured the studies included in our meta-analysis were both relevant and comparable.

The initial literature search yielded 2,327 articles. We limited our scope to peer-reviewed journal articles published in English between 2000 and 2024, excluding non-peer-reviewed publications and other types of documents. The literature search and screening process is presented in Fig. 2. Next, we screened the results to remove studies focused solely on technological issues within information systems, systems integration, or other unrelated topics such as intra-organizational digitalization. This screening process excluded 352 articles, resulting in 1,975 that met the preliminary inclusion criteria. We then reviewed the abstracts of those articles to identify studies specifically addressing SCD, which reduced the pool to 683 relevant articles. We next removed qualitative studies, theoretical or conceptual papers, literature reviews, and empirical studies that did not report correlations between constructs, as those data are necessary for a meta-analysis. That process reduced the dataset to 76 potential studies. Following a full-text review, we excluded papers that did not include any measure of interorganizational digitalization. The final dataset included 73 articles, representing 73 independent samples and a combined total of 20,903 firms. A complete list of those studies is provided in Appendix 1, including the category to which they belong (value creation/value capture) and the performance outcomes measured in the articles.

3.3. Coding and content analysis of the studies

To classify the digital technologies discussed in the selected articles into value-creation and value-capture categories, we conducted a structured content analysis comprising two interrelated phases. The content analysis was conducted based on the measures used in different studies. The first phase involved deductive coding of each study based on an analytical framework and its six theory-driven functional

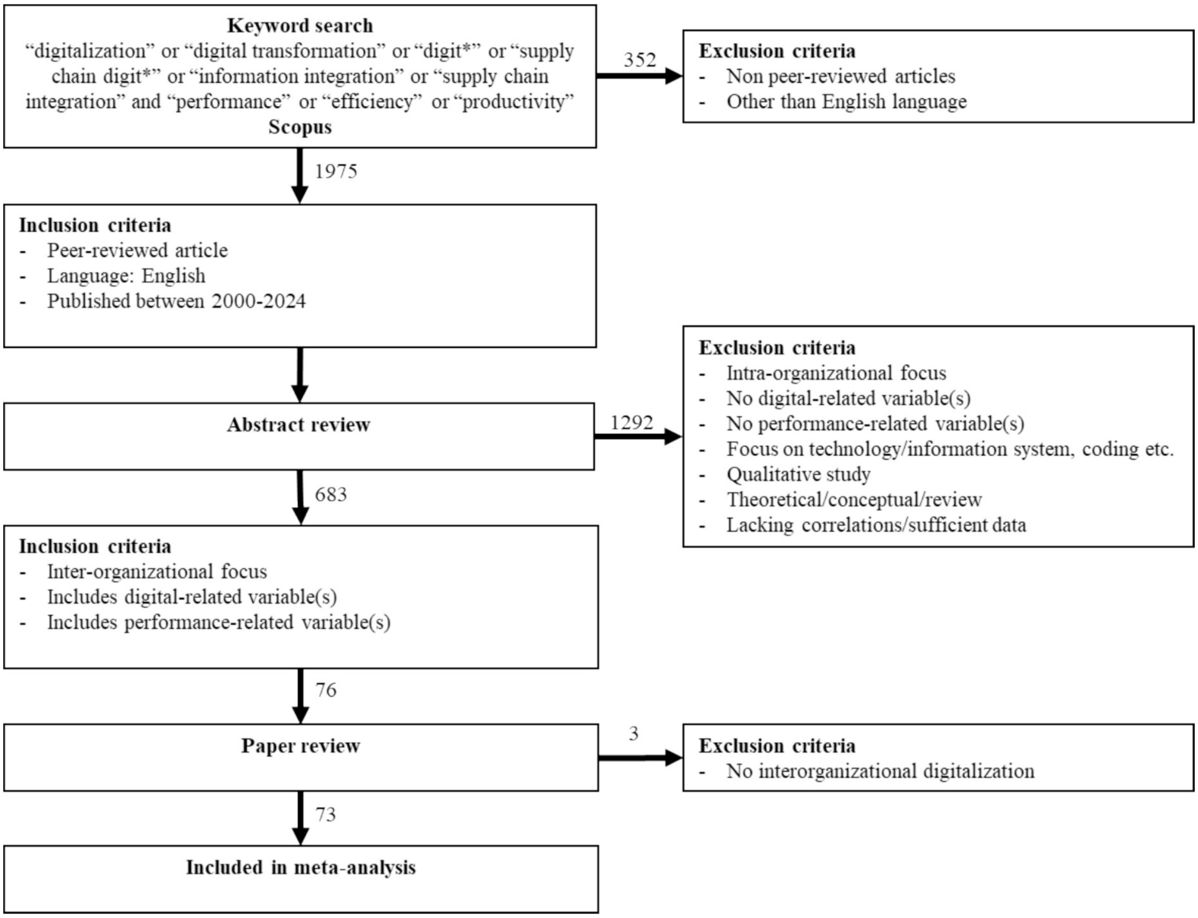

Fig. 2. Overview of the literature search and screening.

categories (Fig. 1). The value creation mechanism comprises three categories guiding the deductive coding: optimizing production and delivery; strengthening collaboration and resource-sharing; and exploring new markets and business models. Similarly, the value-capture mechanism comprises three categories guiding the deductive coding: enhancing transactional security and reducing costs; optimizing pricing, revenue models, and financial control; and scaling benefits across supply chain relationships. The theory-driven categories guided our second phase of coding that employed a directed qualitative content analysis (Hsieh & Shannon, 2005). Content analysis is a systematic and replicable technique for interpreting textual data that is particularly apt for uncovering recurring patterns and meanings across a corpus of literature (Elo & Kyngäs, 2008; Krippendorff, 2018; Mayring, 2014). Our content analysis revealed ten themes that specify the functional categories further. Six of those related to value creation and four to value capture. The content analysis process is presented in Fig. 3.

Table 1 illustrates the studies analyzed (see Table 1, Column 3) and classified according to the functional categories and the inductive themes (see Table 1, Columns 1 and 2). Illustrative examples help clarify how studies were classified. For instance, under the category *exploring new markets and business models* (Value creation) and its theme of *strategic transformation*, the study by Dubey et al. (2023) investigates the use of technologies such as AI and big data to monitor market shifts and guide strategic adaptation. Similarly, within the same category and its theme of *data-driven business development*, the work of Belhadi, Mani, Kamble, Khan, and Verma (2024) analyzes how AI supports environmental forecasting and supply chain decision-making. Conversely, under the category of *scaling benefits across supply chain relationships* (Value capture) within the theme of *infrastructure between systems and actors*, the work of Pattanayak and Punyatoya (2020) focuses on the use of electronic systems to coordinate procurement activities. The structure, depicted in Table 1, facilitates a nuanced understanding of the distinct roles of digital technologies in supply chain performance. By combining theoretically informed categories with inductively derived themes, our analysis provides a structured, yet empirically grounded, framework for interpreting the contributions of SCD. Moreover, this classification informed the subgroup analyses in the meta-analysis, allowing us to compare performance outcomes across differentiated digitalization strategies.

Following the coding and thematic analysis of digitalization functions, the next step in our study involved a content analysis of the performance measures used across the included articles. As with digitalization, the conceptualization of performance in the literature is heterogeneous, reflecting the diverse objectives and contexts of empirical research. To support our meta-analytic comparisons and ensure analytical consistency, we systematically categorized the various forms of performance reported in the studies (see Table 2).

As Table 2 illustrates, performance was found to be conceptualized along several dimensions. Financial performance encompasses metrics such as sales growth, economic performance, profitability, market share, return on investment (ROI), and total sales. Competitive performance refers to firm competitiveness or performance measures relative to industry peers. Innovation performance captures outcomes related to product or process innovation, innovation capability, service innovation, and innovation success. Operational performance is reflected in key metrics, including delivery reliability, cost efficiency, speed, quality, and flexibility. Finally, supply chain performance encompasses broader interorganizational outcomes such as supply chain effectiveness, partnership quality, satisfaction, and transparency. This structured categorization of performance constructs supported the analysis of how

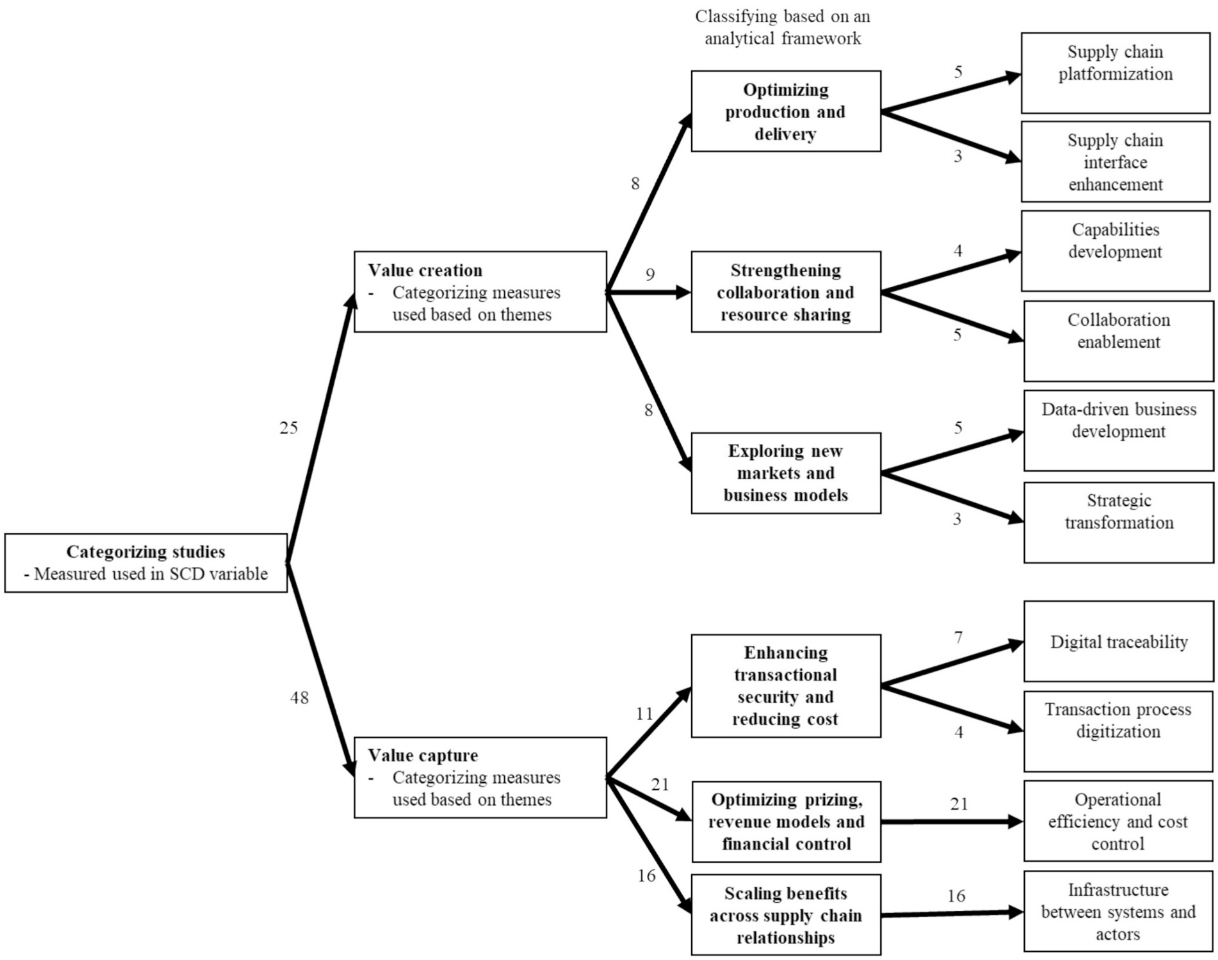

Fig. 3. Phases of the content analysis.

different digitalization strategies relate to distinct types of performance outcomes and conducted subgroup analyses within the meta-analysis.

3.4. Meta-analytic procedures

The meta-analysis employed the Hunter–Schmidt method (Schmidt & Hunter, 2015), which is based on correlations that are corrected for artifacts that attenuate correlations. Several studies included in the analysis studied multiple dimensions of either SCD or performance, and a single estimate was calculated for those by averaging the reported correlations (Ataseven & Nair, 2017; Crook, Ketchen, & D. J., Combs, J. G., & Todd, S. Y., 2008). The effect size was calculated by using the mean of sample size weighted correlations ($\bar{r}$) because using the sample size weighted correlations causes the positive and negative sampling errors to cancel each other out (Hunter & Schmidt, 1994; Schmidt & Hunter, 2015). Moreover, reliability coefficients were used to correct the effect of measurement error. Composite reliability was used to correct study estimates for measurement error. If the study reviewed did not report composite reliability, Cronbach's alpha was used, as the meta-analysis by Peterson and Kim (2013) suggests that those measures can be used interchangeably in correcting effect sizes in meta-analyses. If a study reported neither composite reliability nor Cronbach's alpha values, an average reliability of other samples was used to correct the study estimate for measurement error. Further, the corrected effects (r_c) for each study were used to calculate the corrected sample size weighted mean estimates ($\bar{r}_c$) (Schmidt & Hunter, 2015).

Publication bias was addressed by conducting the file drawer test and using a funnel plot. The file drawer test was calculated based on effect size (Orwin, 1983; Schmidt & Hunter, 2015). The results indicate that there would have to be 181 missing studies of zero-effect size to reduce the observed $\bar{r}$ to an insignificant level (Orwin, 1983), and it is highly unlikely that 181 zero-effect studies would be missing from our sample. Therefore, the file drawer test indicates that publication bias should not be an issue. That conclusion was backed up by the funnel plot test revealing a near-symmetrical funnel plot (McDaniel, Rothstein, & Whetzel, 2006; Schmidt & Hunter, 2015).

4. Results

4.1. Content analysis

The content analysis of the articles enabled a more granular articulation of the value creation and value-capture categories established in the study's analytical framework. In terms of value creation, the category of optimizing production and delivery was refined into two themes: *supply chain platformization* and *supply chain interface enhancement*. Supply chain platformization refers to the deployment of digital platforms that integrate multiple supply chain actors, data sources, and operational processes, thereby facilitating real-time coordination, joint decision-making, and system-wide collaboration (Cenamor et al., 2019; L. Liu et al., 2023; Zhu et al., 2020). Digital platforms enhance supply chain agility, responsiveness, and adaptability to change (Deepu & Ravi, 2023; Perano et al., 2023). Supply chain interface enhancement complements that by improving the quality, frequency, and effectiveness of interactions between supply chain partners. The process works by leveraging user-friendly digital tools such as real-time dashboards,

Table 1
Coding and content analysis of the studies included in the meta-analysis.

Theoretical framework	Theme that emerged from analysis	Study of sample	Measures applied
Optimizing production and delivery		Zhu, Zhao, and Bush (2020)	Platform architecture flexibility
(Value creation)	***Supply chain platformization***	Cenamor et al. (2019)	Platform integration DPC
			Platform technology usage
		Yang et al. (2019)	Platform-based digital connectivity
		Rajala and Hautala-Kankaanpää (2023)	Digital platform capability
		Liu, Long, Fan, Wan, and Liu (2023)	
	Supply chain interface enhancement	Ganbold et al. (2021)	Supply chain application
		Latan et al. (2024)	Supply chain transparency
		Balci & Ali, 2024)	Supply chain visibility
		Chi et al. (2018)	Digital collaboration capabilities
	Capabilities development	Yu, Chavez, Liu, and Cadden (2024)	Digital supply chain practices
		Argyropoulou, Garcia, Nemati, and Spanaki (2024)	
Strengthening collaboration and resource-sharing **(Value creation)**		Wong, Lai, Cheng and Lun (2015)	IoTC (Internet of Things capability)
			IT-enabled collaborative decision-making
		Zhang et al. (2023)	IT integration
	Collaboration enablement		IT integration
		Wang, Liu, and Fang (2022)	IT integration
		Rai and Tang (2010)	Web-based DCM integration
		Chong and Zhou (2014)	
		Gu, Jitpaipoon, and Yang (2017)	External information systems integration
		Shafique, Yeo, and Tan (2024)	Big data predictive analytics
Exploring new markets and business models **(Value creation)**	***Data-driven business development***		Blockchain technology adoption
		Kamble et al. (2023)	B2B e-commerce SC integration
			E-procurement
		Iyer, Germain, and Claycomb (2009)	Use of AI
		Chang, Tsai, and Hsu (2013)	
		Belhadi et al. (2024)	
	Strategic transformation	Nayal, Raut, Yadav, Priyadarshinee, and Narkhede (2022)	Digital transformation
			Digital transformation strategy
		Lerman, Benitez, Müller, De Sousa, and Frank (2022)	
			Digital agility
		Dubey et al. (2023)	
Enhancing transactional security and reducing costs		Liu, Fang, Feng, and Xi (2024)	Blockchain technology adoption
		Zelbst et al. (2024)	Blockchain technology utilization
(Value capture)	***Digital traceability***	Fosso Wamba, Queiroz, and Trinchera (2020)	Blockchain transparency
			Digital traceability
		Zhou, Lu, and Kumar Mangla (2024)	Supply chain visibility
		Al-Khatib (2023)	Supply chain visibility
		Chatterjee, Mariani, and Ferraris (2024)	Supply visibility
		Hu, Jiang, and Huo (2024)	
	Transaction process digitization	Beka Be Nguema et al. (2021)	Digitization
		Ali et al. (2020)	Trade digitization
			Trade digitization
		Ali, Gongbing, and Mehreen (2019)	E-business collaboration
		Devaraj, Krajewski, and Wei (2007)	
		Enrique et al. (2022)	Base technologies
			The breadth of DT asset deployment
		Ye et al. (2022)	Digital SC platform deployment depth
		Li, Xu, Ning, Liu, & Yang, 2023	
		Yang, Hu, Shao, Shou, and He (2023)	Digital technology adoption
		Patil et al. (2024)	Digital technology usage
		Yu et al. (2021)	Information technology
		Vanpoucke, Vereecke, and Muylle (2017)	Information technology
Optimizing pricing, revenue models, and financial control			IT use for relational search
			Supplier information technology
(Value capture)	***Operational efficiency and cost control***		Supply chain digitalization
			Supply chain digitalization
			Use of cloud-enabled supply chains
		Hensen and Dong (2020)	Use of digital technologies
			Use of digital technologies in SC
		Yu et al. (2021)	Supply-side EB application
			Web-enabled SCM
		Zhou, Wang, Li, Teo, and Yang (2023)	Big-data-driven supply chain
		Zhao, Hong, and Lau (2023)	
			Data analytic skills
		Shee et al. (2018)	Industry 4.0 adoption in the supply chain
		Mora-Monge et al. (2023)	Industry 4.0 adoption in the supply chain
		Frederico, Kumar, Garza-Reyes, Kumar, and Agrawal (2023)	Operational coordination

(*continued on next page*)

Table 1 (*continued*)

Theoretical framework	Theme that emerged from analysis	Study of sample	Measures applied
Scaling benefits across supply chain relationships **(Value capture)**	***Infrastructure between systems and actors***	Wiengarten, Bhakoo, and Gimenez (2015) Ranganathan, Teo, and Dhaliwal (2011) Gawankar et al. (2020) Chen, Tang, Liu, and Gu (2023) Huang, Wang, Lee, and Yeung (2023) Oliveira-Dias, Maqueira-Marin, Moyano-Fuentes, and Carvalho (2023) Liu, Wei, Ke, Wei, and Hua (2016) Van der Vaart et al. (2012) Zhang, Van Donk, and van der Vaart (2016) Ruzo-Sanmartín, Abousamra, Otero-Neira, and Svensson (2024) Bharadwaj, Bharadwaj, and Bendoly (2007) Vickery, Jayaram, Droge, and Calantone (2003) Liu, Huang, Wei, and Huang (2015) Braojos, Benitez, Llorens, and Ruiz (2020) Zhu, Lin, Jiang, and Liu (2022) Wong, Lai and Bernroider (2015) Sundram, Bahrin, Abdul Munir, and Zolait (2018) Rai, Patnayakuni, and Seth (2006) Frohlich and Westbrook (2002) Kim and Cavusgil (2009) Pattanayak and Punyatoya (2020) Li et al. (2023) Wang, Wan, Ma, Zhou, and Chen (2023)	Communication infrastructure Electronic linkages Integrated information technology Integrated IS capability Integrative information technologies Internet-enabled supply process integration IT integration capability Online procurement capability Supply chain information integration Supply chain information system infrastructure Supply chain process integration capability Supply integration Systems integration Supply chain technology internalization Digital supply chain capabilities Digital platform reconstruction capability

DPC= Digital platform capability; DCM=Demand chain management; DT=Digital transformation; EB=E-business; IS=Information systems; SC=Supply chain

intuitive customer-facing applications, and seamless communication interfaces (Balci & Ali, 2024; Ganbold et al., 2021; Latan et al., 2024).

The second major value creation category, strengthening collaboration and resource-sharing, revealed themes of *capabilities development* and *collaboration enablement*. Capabilities development centers on building both organizational and interorganizational competencies in areas such as digital operations, data analytics, and change management (Argyropoulou et al., 2024; W. Yu et al., 2024). Those competencies are critical for the effective adoption, integration, and scaling of digital technologies across supply networks (Ganbold et al., 2021). Collaboration enablement, in turn, emphasizes the role of digital solutions, such as cloud computing, the Internet of Things (IoT), and collaborative software, to build trust, foster communication, and enable cross-boundary innovation (Y. Wang et al., 2022; M. Zhang et al., 2023). Those tools strengthen partnerships by facilitating real-time knowledge sharing and coordination (McIntyre et al., 2023; Minerbo & Brito, 2022).

The third value creation category, *exploring new markets and business models*, includes the themes of *data-driven business development* and *strategic transformation*. The first encompasses the use of big data analytics, AI, and predictive modeling to identify market opportunities, unpack customer insights, and diagnose operational inefficiencies (Belhadi et al., 2024; Kamble et al., 2023; Shafique et al., 2024). Such digital capabilities enable firms to innovate proactively, align activity with customer needs, and continuously improve products and services (Martín-Peña et al., 2020). The second theme, strategic transformation, entails leveraging digital technologies to reconfigure core business models, redefine value propositions, and enhance competitive positioning (Dubey et al., 2023; Nayal et al., 2022). Strategic transformation initiatives encourage firms to rethink their roles in supply networks, explore new revenue streams, and build long-term strategic agility (Liao et al., 2017; Zekhnini et al., 2020).

In terms of value capture, the first overarching category, *enhancing transactional security and reducing costs*, was specified through the themes of digital traceability and digitization of the transaction process. Digital traceability involves employing technology such as blockchains, the IoT, and distributed digital ledgers to trace and verify the movement, origin, and condition of goods across the supply chain (Al-Khatib, 2023; Fosso Wamba et al., 2020; X. Zhou et al., 2024). These technologies contribute to improved process transparency, regulatory compliance, and reputational safeguarding by enhancing data integrity and accountability (Gurtu & Johny, 2019). Transaction process digitization refers to the automation of contractual and financial transactions by means of tools such as smart contracts, e-invoicing systems, and digital payment platforms (Ali et al., 2019; Devaraj et al., 2007). Such technologies reduce administrative burden, increase transaction speed, and enhance the overall security and reliability of financial exchanges (Perano et al., 2023).

The second value-capture category, *optimizing pricing, revenue models, and financial control*, revealed the theme of *operational efficiency and cost control*. This theme highlights the use of digital tools, such as robotic process automation (RPA), cloud-based enterprise resource planning systems, and advanced analytics, to streamline production, logistics, and inventory management (Chen et al., 2023; Mora-Monge et al., 2023; Shee et al., 2018). The focus is on reducing waste and operating costs and converting digital investments into financial returns (Nasiri et al., 2020).

The third category of value capture, scaling benefits across supply chain relationships, was specified through the theme of *infrastructure between systems and actors*. This theme directs attention to the significance of interoperable digital technologies, such as application

Table 2
Performance measures in the studies included in the meta-analysis.

Performance type	Study	Measures used (examples)
Financial performance	Ruzo-Sanmartín et al. (2024)	Sales growth, return on sales
	Zhou et al. (2024)	Return on sales, market share, ROI, reduction of costs
	Yang et al. (2023)	Cost efficiency
	Al-Khatib (2023)	Reduction of costs, returns
	Chen et al. (2023)	Sales growth, market share, profit growth
	Patil et al. (2024)	ROA, ROI, profit margin, costs
	Ali et al. (2020)	Sales growth, cash flow, profit
	Braojos et al. (2020)	Sales, market share, profit margin. ROA
	Gu et al. (2017)	Sales growth, market share, ROI, profit margin
	Vickery et al. (2003)	ROA, ROI, return on sales
	Wiengarten et al. (2015)	Sales, market share, return on sales, ROI
	Li et al. (2023)	Return on sales, ROI, earnings before interest and taxes
	Gawankar et al. (2020)	ROI, profit margin, market share, sales growth, total sales
	Iyer et al. (2009)	ROI, profit, profit growth
	Yu et al. (2021)	Sales growth, return on sales, profit, market share, ROI
	Liu et al. (2016)	ROI, cash flow of operations, net income, profit
	Rai et al. (2006)	Sales growth, new revenue streams
	Yu et al. (2021)	Sales growth, return on sales, profit, market share, ROI
	Shee et al. (2018)	Sales growth, new revenue streams, market share
	Liu et al. (2023)	New product introduction rate, product success, product cycle time
	Mora-Monge et al. (2023)	Enhance competitiveness, catch up with competitors, better products
	Chatterjee et al. (2023)	Improved performance, improved competitiveness
	Li, Liu et al. (2023)	High-quality products, new product introduction, rapid responses
	Wang et al. (2022)	Performance risks
	Zhu et al. (2022)	Market share, profit, sales volume growth
	Lerman et al. (2022)	Increased material recycling, reduced emissions
Competitive performance (assessed in comparison with competitors)	Cenamor et al. (2019)	Sales growth
	Kim and Cavusgil (2009)	Sales growth, market share, market development
	Liu et al. (2015)	Rapid response to market demands, rapid response to customers
	Rai et al. (2010)	Market share, profitability, growth, innovativeness, cost leadership
	Ranganathan et al. (2011)	Improved customer service, generating a competitive advantage
	Wong, Lai, Cheng et al. (2015)	Rapid response to orders, few errors, delivered in schedule
	Zhu et al. (2020)	Market share, profit, sales volume growth
	Li et al. (2023)	Strategic advantage over competitors, market share, successfulness
	Gawankar et al. (2020)	Growth of market share, growth price-to-earnings
	Iyer et al. (2009)	Market share growth, sales growth
	Hu et al. (2024)	Acquired manufacturing technologies, product development skills
	Wang et al. (2023)	Knowledge acquiring, systems for finding and acquiring knowledge, etc.
	Zhang et al. (2023)	Process renewal, new procedures or systems
Innovation performance	Chi et al. (2018)	Competence for creating new services, products, business models
	Chong et al. (2014)	Service process innovation, service product innovation
	Hensen et al. (2020)	Innovation success
	Gawankar et al. (2020)	custom-made products, altering products
	Shafique et al. (2024)	On-time delivery, decrease inventory level, product quality
	Oliveira-Dias et al. (2023)	Inventory turnover, cycle time, on-time delivery, fast delivery
	Yu et al. (2023)	On-time delivery, product quality, time to fulfill orders
	Enrique et al. (2022)	Delivery flexibility, manufacturing flexibility
	Rajala et al. (2023)	Delivery performance, production costs, product quality
	Ganbold et al. (2021)	Delivery, quality, production costs, inventory level
	Bharadwaj et al. (2007)	Inventory turns, operating margin, on-time ratio
	Devaraj et al. (2007)	Delivery reliability, delivery speed, inventory turns, defects
	Sundram et al. (2018)	Delivery, flexibility, order fulfillment speed
Operational performance	van der Vaart, van Donk, Gimenez, and Sierra (2012)	Production costs, stock levels, cost-to-serve the customer
	Vanpoucke et al. (2017)	Cost efficiency, flexibility, delivery performance
	Wong et al. (2015)	Delivery performance, flexibility, errors, lead time
	Iyer et al. (2009)	On-time deliveries, reject level, inventory turnover
	Yu et al. (2021)	Product quality, production cost, delivery dependability
	Liu et al. (2016)	Delivery cycle time, rapid responding (markets, customers)
	Rai et al. (2006)	Product delivery cycle time, productivity improvements
	Yu et al. (2021)	Product quality, production cost, delivery dependability
	Balci et al. (2024)	Meeting expectations, time between order and delivery
	Liu et al. (2024)	Supply chain adaptability, response to disruptions, recovery
	Latan et al. (2024)	supply chain rapid responses, SC's ability to handle nonstandard orders
	Belhadi et al. (2024)	Order fill rate, order fulfillment lead time, on-time delivery
	Zelbst et al. (2024)	SC's ability to deliver zero-defect products, quick responses, adaptability
Supply chain performance	Zhou et al. (2023)	SC's ability to deliver zero-defect products, on-time delivery, value-added services
	Kamble et al. (2023)	SC's ability to deliver zero-defect products, on-time delivery, value-added services
	Huang et al. (2023)	Supply chain resilience
	Frederico et al. (2023)	Responsiveness in supply chain
	Zhao et al. (2023)	Lead time, return on investment, customer satisfaction
	Dubey et al. (2023)	Supply chain resilience

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Table 2 (*continued*)

Performance type	Study	Measures used (examples)
	Argyropoulou et al. (2023)	Building strong bonds with customers, improved customer satisfaction, sales
	Ye et al. (2022)	SC's ability to deliver zero-defect products, on-time delivery, value-added services
	Nayal et al. (2022)	Supply chain costs, supply chain emissions and waste
	Pattanayak et al. (2020)	On-time project, client satisfaction, project costs, quality
	Ali et al. (2019)	Supply chain effectiveness
	Beka Be Nguema et al. (2021)	Supply chain effectiveness
	Chang et al. (2013)	Cost management, profit management, material availability, customer satisfaction
	Fosso Wamba et al. (2020)	supply chain rapid responses, SC's ability to handle nonstandard orders
	Frohlich et al. (2002)	Delivery times, reduced transaction costs, profitability, inventory turnover
	Yang et al. (2019)	Relationship performance
	Zhang et al. (2016)	Supplier performance
	Shee et al. (2018)	Conformance quality, delivery reliability

programming interfaces (APIs), cloud-based coordination platforms, and IoT networks, in facilitating real-time synchronization, coordination, and mutual value gains spanning firm boundaries (Dolgui, Ivanov, & Sokolov, 2020; Queiroz, Telles, & Bonilla, 2020). These technologies enable heterogeneous systems to communicate effectively, increasing visibility, improving coordination, and fostering equitable benefit-sharing in complex supply ecosystems. The nuanced analysis described clarifies how digital technologies contribute to different dimensions of value creation and capture. It also highlights the interconnected nature of those mechanisms across modern, digitalized supply chains. The next section reports the results of the meta-analysis.

4.2. Meta-analysis

First, we tested the overall associations of SCD and performance, and the results showed a positive relationship, as the estimated effect size after correcting for the measurement error was $\bar{r}_c$=0.35. Second, we tested the associations between value capture and different performance outcomes. The analysis showed that the relationships between value capture and performance outcomes varied as follows: competitive performance $\bar{r}_c$=0.48, supply chain performance $\bar{r}_c$=0.46, innovation performance $\bar{r}_c$=0.32, financial performance $\bar{r}_c$=0.31, and operational performance $\bar{r}_c$=0.24.

Third, we examined the relationship between value creation and various performance outcomes. The analysis revealed that the value creation–performance relationships were as follows: innovation performance $\bar{r}_c$=0.46, supply chain performance $\bar{r}_c$=0.42, competitive performance $\bar{r}_c$=0.32, operational performance $\bar{r}_c$=0.32, and financial performance $\bar{r}_c$=0.27.

Further, we assessed whether the mechanisms of value capture and value creation produce different effects on performance. The results demonstrate that when considering performance as such, it does not matter whether the digital technologies are used for value capture ($\bar{r}_c$=0.36) or value creation ($\bar{r}_c$=0.36) purposes. The meta-analytic results are presented in Table 3.

We also tested the data based on our categorization, that is, whether using digital technologies in different ways affects performance. The results are presented in Table 4 and demonstrate that concerning value creation, digital technologies are most effective if they are used in supply chain interface enhancement ($\bar{r}_c$=0.559 or for capabilities development ($\bar{r}_c$=0.52). Regarding value capture, the results show that the most effective way to use digital technologies is to advance digital traceability ($\bar{r}_c$=0.49).

5. Discussion

5.1. Theoretical contributions

While prior research largely emphasizes the overall positive effects of supply chain digitalization (SCD) (e.g., Deepu & Ravi, 2023; Ganbold et al., 2021), empirical findings remain fragmented and sometimes contradictory (Nasiri et al., 2020; Paolucci et al., 2021). This inconsistency points to a lack of conceptual clarity regarding which aspects of supply chain activities are digitalized, through which underlying value mechanisms, and with what performance implications. This study addresses this gap by introducing a value-oriented perspective that distinguishes between value creation and value capture as two overarching value mechanisms through which SCD operates, as depicted in Fig. 4. Each of these value mechanisms is disaggregated into three functional categories (indicated by the titles of the text boxes), reflecting distinct roles that digital technologies play in supporting supply chain activities. Within each functional category, the figure further illustrates empirically derived themes (presented as bullet points) that specify how digitalization has been examined in prior research. The performance outcomes associated with the value mechanisms are shown on the right-hand side of the figure, highlighting that value-creation-oriented digitalization is primarily linked to innovation performance and supply chain performance, whereas value-capture-oriented digitalization shows stronger associations with competitive performance, while supply chain performance emerges as a shared outcome across both mechanisms. The thickness of the arrows indicates the relative strength of the meta-analytic effects on the respective performance outcomes, with thicker arrows representing stronger relationships.

Building on the findings summarized in Fig. 4, the current research advances three core theoretical contributions to the SCD literature. First, it introduces a value-oriented perspective that reframes digitalization as a dual-value process that enables both value creation and value capture, thereby advancing SCD theory and extending the seminal work on value in supply chains (Lepak et al., 2007; Minerbo & Brito, 2022; Ramsay, 2005). Whereas prior SCD research has often focused narrowly on operational efficiencies or isolated technologies, this study integrates disparate streams of literature into a **cohesive perspective grounded in value**. We conceptualize **value creation** in SCD as the generation of benefits and opportunities through the strategic use of digital tools, platforms, and data to enhance supply chain design and execution. In contrast, **value capture** refers to the appropriation and retention of those benefits by supply chain actors through mechanisms such as digitized transactions, data protection, and strategic control over digital flows (Deepu & Ravi, 2023; McIntyre et al., 2023; Perano et al., 2023). The distinction between value creation and value capture offers a novel lens through which to evaluate digital technologies according to their purpose and function within the supply chain, which is the basis of our second contribution.

Second, the disaggregation of value creation and value capture mechanisms offers an opportunity to analyze digitalization tools in terms of their role and purpose within supply chains. This analysis culminates in categorizing value creation and value capture in a way that balances the diverse functions of digital technologies within supply chains with their intended roles in supporting either value creation or value capture. Accordingly, we conceptualize three value-creation

Table 3
The meta-analytic results.

Relationship	N	K	$\bar{r}$	$\bar{r}_c$	$\sigma^2_{\bar{r}}$	σ^2_e	95% CI	Q-statistic for Homogeneity Test (d.f.)
			$r_{\bar{}} = \frac{\sum [Ni\, ri]}{\sum Ni}$	$r\bar{c} = \frac{\sum [Ni\, rc]}{\sum Ni}$	$\sigma^2_{\bar{r}} = \frac{\sum Ni\,(ri-\bar{r})^2}{\sum Ni}$	$\sigma^2_e = \frac{(1-\bar{r}^2)^2}{\sum Ni - 1}$		
SC digitalization - Performance	20 903	73	0.36	0.35	0.04	0.00	0.31 : 0.40	1221.46 (72)
Value creation - Performance type								
Innovation performance	823	3	0.47	0.46	0.01	0.00	0.36 : 0.57	11.63 (2)
Supply chain performance	2 162	9	0.42	0.42	0.05	0.00	0.28 : 0.56	151.84 (8)
Operational performance	762	5	0.34	0.32	0.05	0.00	0.15 : 0.54	49.40 (4)
Competitive performance	1 150	6	0.32	0.32	0.03	0.00	0.20 : 0.45	37.16 (5)
Financial performance	372	2	0.28	0.27	0.00	0.00	0.22 : 0.33	0.68 (1)
Value capture - Performance type								
Competitive performance	2 715	9	0.49	0.48	0.01	0.00	0.42 : 057	64.30 (8)
Supply chain performance	4 120	14	0.46	0.46	0.05	0.00	0.34 : 0.58	342.80 (13)
Innovation performance	1 955	4	0.33	0.32	0.02	0.00	0.20 : 0.46	43.14 (3)
Financial performance	5 683	17	0.31	0.31	0.05	0.00	0.21 : 0.41	313.14 (16)
Operational performance	2 925	12	0.24	0.24	0.02	0.00	0.15 : 0.33	80.67 (11)
Value domain - Performance								
Value capture	17 398	47	0.36	0.36	0.04	0.00	0.30 : 0.42	1013.48 (46)
Value creation	5 971	27	0.37	0.36	0.04	0.00	0.29 : 0.44	315.08 (26)

N=total sample size (sum over independent samples); K=number of independent samples

Table 4
The results of category-based analysis.

Categories	N	K	$\bar{r}$	$\bar{r}_c$	$\sigma^2_{\bar{r}}$	σ^2_e	95% CI	Q-statistic for Homogeneity Test (d.f.)
Value creation								
SC interfaces enhancement	682	3	0.53	0.55	0.02	0.00	0.39 : 0.72	26.26 (2)
Capabilities development	551	4	0.53	0.52	0.00	0.00	0.49 : 0.55	1.17 (3)
Data-driven business development	1 227	7	0.40	0.38	0.04	0.00	0.24 : 0.52	60.87 (6)
SC Platformization	1 068	5	0.36	0.36	0.04	0.00	0.18 : 0.54	61.82 (4)
Collaboration enablement	1 406	5	0.32	0.32	0.03	0.00	0.16 : 0.48	56.86 (4)
Strategic transformation	1 037	3	0.20	0.20	0.02	0.00	0.04 : 0.36	22.45 (2)
Value capture								
Digital traceability	3 009	7	0.49	0.49	0.05	0.00	0.32 : 0.66	272.57 (6)
Infrastructure between systems and actors	3 581	17	0.38	0.38	0.03	0.00	0.29 : 0.47	151.53 (16)
Transaction process digitization	957	4	0.35	0.36	0.01	0.00	0.26 : 0.47	14.03 (3)
Operational efficiency and cost control	9 851	28	0.32	0.31	0.04	0.00	0.24 : 0.39	513.70 (27)

categories (see Fig. 3): 1. *optimizing production and delivery,* 2. *strengthening collaboration and resource-sharing, and* 3. *exploring new markets and business models,* and three value-capture categories: 1. *enhancing transactional security and reducing costs,* 2. *optimizing pricing, revenue models, and financial control, and* 3. *scaling benefits across supply chain relationships.* Further, our content analysis identified ten themes that delimit those categories. It also revealed how digital technologies operate within each (see bullet points in Fig. 3). For example, under optimizing production and delivery, two themes emerge: *supply chain platformization* and *supply chain interface enhancement.* This conceptualization addresses a longstanding gap in the literature: Although supply chain value processes are widely recognized, prior SCD research rarely distinguishes how technologies enable value creation as opposed to value capture. By explicitly linking digital technologies to these mechanisms, categories, and themes, we offer a structured and nuanced framework clarifying the functional roles and performance implications of digitalization in supply chains. The framework will help researchers to move beyond broad claims about digital transformation and identify more precisely which technologies support specific strategic outcomes. This increased nuance facilitates a more targeted analysis of performance, as elaborated in our third contribution. This categorization also enables a more precise examination of how different digitalization logics translate into distinct performance outcomes, as discussed next.

Third, our meta-analysis demonstrates that digital technologies supporting value creation and value capture are associated with systematically different performance outcomes, while both mechanisms contribute to supply chain performance (see Fig. 4). This distinction helps explain why prior empirical findings on SCD–performance relationships have been fragmented and highlights supply chain performance as a bridging outcome through which both value mechanisms operate.

At a general level, both value creation and value capture mechanisms enhance supply chain performance because they improve coordination and collaboration across supply chain activities, albeit through different underlying logics. Value-creation-oriented digitalization strengthens supply chain performance by improving transparency, responsiveness, and alignment among actors through shared interfaces, platforms, and collaborative technologies. Examples include interface enhancement and supply chain platformization enabled by real-time tracking technologies, cloud-based platforms, and IoT applications that support agile and adaptive supply chain processes. In parallel, value-capture-oriented digitalization enhances supply chain performance by building digital infrastructures that span companies and systems, thereby improving visibility, transactional coordination, and network-level efficiency. Technologies such as traceability systems, transaction process digitization, and interoperable infrastructures reduce uncertainty and friction in supply chain operations. In sum, value-creation activities support collaboration within the supply chain, while value-capture activities support coordination of the supply chain, reflecting the coordination-collaboration elements that are essential to managing supply chains. Coordination is an important mechanism facilitating collaboration in interorganizational settings (Picaud-Bello, Stevens, Cloutier, & Renard,

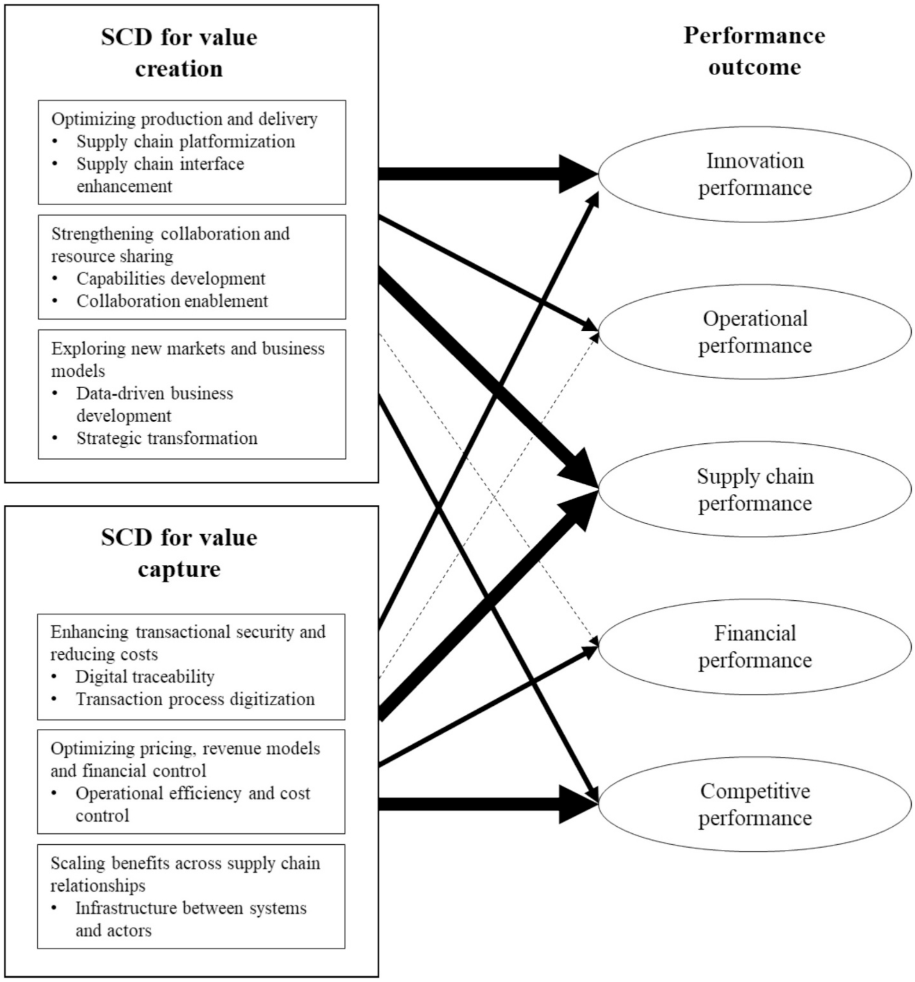

Fig. 4. SCD, value creation, value capture, and performance.

2022). Prior supply chain research has also acknowledged that supply chain coordination and collaboration can be facilitated with digital technologies (e.g., Ergun, Gui, Heier Stamm, Keskinocak, & Swann, 2014); a finding supported by our results. We also elicited evidence on the importance of coordination-collaboration mechanisms to successful and effective supply chain management, as such activities improve supply chain performance. Prior studies have mainly focused on value creation in the supply chain context and have thus considered value capture to a lesser extent (McIntyre et al., 2023). However, our study emphasizes the importance of acknowledging value capture activities in the pursuit of performance outcomes from supply chain operations. Our findings reinforce our initial premise that inconsistent SCD-performance results arise from insufficient attention to the context and intended purpose of digital technologies.

Beyond this shared effect on supply chain performance, the two value mechanisms exhibit distinct associations with other performance outcomes. Value creation mechanisms are more closely linked to innovation performance because they are relational, developmental, and exploratory in nature. Value-creation categories focus on optimizing production and delivery, strengthening collaboration and resource-sharing, and exploring new markets and business models. The activities and technologies underlying these categories, such as big data analytics, digital collaboration tools, strategic interfaces, and data-driven business development, facilitate knowledge exchange, experimentation, and joint problem-solving across organizational boundaries. Through these processes, firms develop new capabilities, redesign supply chain processes, and improve interfaces between actors, which are central drivers of innovation outcomes. Accordingly, value-creation-oriented digitalization predominantly enhances innovation performance while simultaneously contributing to supply chain performance through improved collaboration and adaptability. These findings reinforce prior work highlighting the importance of aligning supply chain activities with customer needs and relational processes in order to create value (Phadnis, 2024).

In contrast, value capture mechanisms are more strongly associated with competitive performance because they emphasize control, efficiency, and appropriation of value. The value capture categories identified in this study include enhancing transactional security and reducing costs, optimizing pricing, revenue models, and financial control, and scaling benefits across supply chain relationships. These activities leverage technologies such as blockchain-based traceability systems, smart contracts, transaction process digitization, and cost-control infrastructures to improve compliance, reduce costs, and strengthen governance across supply chain relationships. By retaining and appropriating value within the firm and across controlled interfaces, value-capture-oriented digitalization enhances firms' competitive positioning. While these mechanisms also contribute to supply chain performance through improved coordination and efficiency, their primary performance effect manifests in competitive outcomes. This insight extends prior SCD research, which has predominantly emphasized value creation while giving comparatively limited attention to value capture (McIntyre et al., 2023).

Taken together, these findings clarify that digital technologies do not enhance performance uniformly. Innovation outcomes are primarily driven by value-creation-oriented digitalization, competitive outcomes are primarily driven by value-capture-oriented digitalization, and supply chain performance emerges as a shared outcome enabled by both mechanisms. This differentiation reinforces our core premise that inconsistent SCD–performance findings stem from insufficient attention to the underlying value mechanisms and the strategic objectives digital technologies are intended to serve. By explicitly accounting for both value creation and value capture, the study advances a more nuanced understanding of how digitalization supports the development of supply chain operations and enhances competitiveness within them.

5.2. Avenues for further research

Building on the findings of this study, future research could advance the understanding of supply chain digitalization (SCD) as a mechanism facilitating value creation and value capture, and how they shape performance outcomes across diverse contexts. We identify three interrelated directions that can guide future research: sectoral and contextual heterogeneity, typological refinement of digital value mechanisms, and temporal dynamics of digital transformation.

5.2.1. Sectoral and contextual heterogeneity

The mechanisms through which SCD fosters value creation and value capture are likely to vary substantially across industries, supply chain configurations, and institutional environments. Firms operating in highly regulated sectors (e.g., pharmaceuticals, food, or energy) may prioritize digitalization for traceability, compliance, and risk mitigation, whereas those in more modular or innovation-driven industries may rely on digital collaboration, analytics, and platform-based integration to enhance adaptability and responsiveness. Future research could examine how contextual contingencies, such as regulatory intensity, supply chain complexity, and market dynamism, moderate or mediate the relationships between digital technologies, value mechanisms, and performance outcomes. Potential research questions include:

- How do sectoral and institutional contingencies influence the configuration and balance of digital value creation and value-capture mechanisms in supply chains?
- How do variations in regulatory pressure, technological maturity, and market dynamism shape firms' strategic orientation toward value creation versus value capture?

5.2.2. Typological refinement of digital value mechanisms

Future research could enhance the understanding of SCD by refining the typology of value creation and value-capture mechanisms identified in this study. Developing more nuanced distinctions, such as between exploratory and exploitative, relational and transactional, or data-driven and process-oriented digitalization activities, could illuminate how different digitalization patterns shape performance outcomes. Comparative investigations across network structures, such as linear, modular, and platform-based supply chains, could clarify how configurations of digital resources and governance arrangements affect the distribution and appropriation of value among actors. This typological perspective could contribute to mid-range theorizing on why similar digital initiatives yield heterogeneous outcomes across supply chains. Promising research questions include:

- How can refined typologies of digitalization mechanisms explain heterogeneity in performance outcomes across different supply chain types and governance structures?
- How do relational versus transactional digitalization activities influence interfirm trust, coordination, and long-term value outcomes within digital supply networks?

5.2.3. Temporal dynamics of digital transformation

Further research should also explore the temporal dynamics through which SCD generates and sustains value over time. Digitalization is not a one-off investment but an ongoing process of strategic renewal and capability reconfiguration. Longitudinal studies could examine the trade-offs between short-term operational efficiency and long-term innovation, as well as the mechanisms that enable firms to sustain digital advantage and resilience in turbulent environments. Understanding how digital capabilities evolve, decay, or renew over time would provide deeper theoretical insight into the life cycle of digital transformation and its implications for value creation and value capture. Promising research questions include:

- How do the trajectories of digital transformation influence the evolution of value creation and value-capture mechanisms and their long-term performance outcomes?
- How do firms balance short-term efficiency goals with long-term innovation and resilience when managing the temporal trade-offs of digital transformation?

Such research could deliver a comprehensive theoretical understanding of how digital technologies generate, distribute, and sustain value across diverse contexts, over time, and through distinct mechanisms of value creation and value capture.

5.3. Managerial implications

This study introduces a value creation and value-capture framework that would enable decision-makers to evaluate the scalability and adaptability of digital technologies across diverse supply chain contexts. Positioning digital technologies within that framework can guide managers in tailoring digitalization investments to their specific operational and strategic goals. For instance, technologies that enhance value creation, such as AI and data-driven customization, digital twins, and collaborative platforms, are particularly well-suited for dynamic and innovation-intensive environments. Those technologies bolster agility, responsiveness, and customer-centricity, making them ideal for industries facing rapid market shifts or evolving consumer demands. However, technologies that drive value capture, such as RPA, blockchains enhancing traceability, and advanced planning systems, are more likely to offer the greatest benefits in stable or cost-sensitive environments where consistency, efficiency, and margin optimization are strategic priorities.

Digital tools that enhance end-to-end visibility and supply chain collaboration, for example, through real-time analytics or integrated digital platforms, are especially advantageous in global and complex networks, where coordination, risk management, and stakeholder integration are crucial. Conversely, in localized supply chains, automation technologies that reduce labor costs and streamline internal processes may provide greater returns. Acknowledging these contextual dependencies would help managers make informed choices on where and how to deploy digital technologies. Such strategic alignment would permit firms to avoid standardized approaches and prioritize technologies aligned with their supply chain structure, market conditions, and performance objectives.

Furthermore, our findings indicate that the type of value being pursued, creation or capture, has implications for the type of performance outcome that results. Value creation activities are most closely linked to innovation performance, supporting objectives like new product development, service innovation, and differentiation. In contrast, value-capture activities correlate more closely with competitive performance, such as cost leadership, operational excellence, and margin improvement. Therefore, managers planning and implementing digital transformation initiatives should specify the strategic intent behind their digital investments. Is the aim to innovate and differentiate or to streamline and compete on cost? Using the value creation-capture framework could aid firms in aligning specific digital technologies with targeted performance outcomes, enabling them to make performanceoriented investment decisions.

In a rapidly evolving digital landscape characterized by uncertainty and technological saturation, an inherently value-oriented approach offers a practical roadmap for strategic prioritization. Managers leveraging the insights from this framework could maximize both short-term operational gains and long-term strategic resilience, ensuring that digitalization delivers sustainable competitive advantage across various supply chain environments.

6. Conclusions

Despite the rapid adoption of digital technologies in supply chains, research findings on SCD have been inconsistent in terms of performance outcomes. We contend that these inconsistencies arise from a lack of conceptual structure and a limited understanding of how specific technologies, their use contexts, and strategic purposes shape outcomes. To address this gap, we adopted a value-based perspective that distinguishes two interrelated mechanisms, value creation and value capture, and examines their respective impacts. This approach shaped our two research questions: (RQ1) How can SCD be systematically conceptualized in terms of value creation and value capture? and (RQ2) How do these mechanisms influence performance outcomes?

For RQ1, we define value creation as the generation of benefits and opportunities through the strategic deployment of digital tools, platforms, and data to enhance supply chain design and execution, and value capture as the appropriation and retention of these benefits via mechanisms such as digitized transactions, data protection, and strategic control of digital flows. Our synthesis integrates fragmented research into a cohesive framework comprising three value-creation and three value-capture categories, which are further specified into ten sub-themes. For RQ2, our meta-analysis of 73 empirical studies reveals that value-creation mechanisms are most strongly associated with innovation and supply chain performance. In contrast, value-capture mechanisms are more strongly linked to competitiveness and supply chain performance. These findings illuminate distinct performance pathways, helping to explain prior empirical inconsistencies in the SCD literature.

Overall, this study advances SCD theory by introducing a value-oriented framework that organizes supply chain digital technologies and clarifies their performance implications. For managers, the framework offers a structured basis for aligning digital investments with strategic priorities. For scholars, it opens avenues for investigating sectoral contingencies, emerging technologies, and the integration of environmental and social value dimensions into the value-based view of SCD.

CRediT authorship contribution statement

Anni Rajala: Writing – review & editing, Writing – original draft, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Hannu Makkonen:** Writing – review & editing, Writing – original draft, Investigation, Conceptualization.

Declaration of competing interest

None.

Appendix

Appendix 1
The studies included in the meta-analysis.

Study	The use of digitalization	Type of performance	Corrected correlation $\bar{r}_c$	CI 95 % Lower bound	CI 95 % Upper bound	Study sample size (N)	Attenuation factor	Digitalization-performance correlation r	Error variance	Study weight (W)
Balci et al. (2024)	CR	SCP	0.59	0.54	0.64	311	0.96	0.56	0.00	284.04
Liu et al. (2024)	CA	SCP	0.19	0.14	0.23	317	1.02	0.19	0.00	331.35
Hu et al. (2024)	CA	IP	0.37	0.32	0.41	200	0.99	0.36	0.00	197.25
Ruzo-Sanmartín et al. (2024)	CA	FP	0.38	0.33	0.43	205	0.98	0.37	0.00	196.28
Shafique et al. (2024)	CR	OP	0.52	0.47	0.57	197	0.98	0.51	0.00	190.51
Latan et al. (2024)	CR	SCP	0.66	0.61	0.71	263	0.95	0.62	0.00	236.04
Belhadi et al. (2024)	CR	SCP	0.45	0.40	0.50	279	1.10	0.50	0.00	339.71
Zelbst et al. (2024)	CA	SCP	0.23	0.18	0.27	303	1.02	0.23	0.00	312.47
Zhou et al. (2024)	CA	FP	0.45	0.40	0.50	359	1.03	0.46	0.00	377.96
Yang et al. (2023)	CA	FP	-0.02	-0.07	0.03	1238	1.00	-0.02	0.00	1238.00
Zhou et al. (2023)	CA	SCP	0.45	0.41	0.50	223	1.01	0.46	0.00	226.54
Wang et al. (2023)	CR, CA	IP	0.42	0.37	0.47	347	0.99	0.42	0.00	337.68
Li et al. (2023)	CA	FP, CP	0.40	0.36	0.45	399	1.05	0.42	0.00	438.69
Al-Khatib (2023)	CA	FP	0.59	0.54	0.63	380	1.02	0.60	0.00	395.43
Liu et al. (2023)	CR	CP	0.32	0.27	0.36	167	1.01	0.32	0.00	171.99
Kamble et al. (2023)	CR	SCP	0.35	0.30	0.40	187	0.96	0.33	0.00	172.38
Huang et al., 2023)	CA	SCP	0.21	0.17	0.26	408	1.02	0.22	0.00	427.31
Oliveira-Dias et al. (2023)	CA	OP	0.01	-0.04	0.06	256	0.94	0.01	0.00	224.00

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Appendix 1 (*continued*)

Study	The use of digitalization	Type of performance	Corrected correlation r ¯c	CI 95 % Lower bound	CI 95 % Upper bound	Study sample size (N)	Attenuation factor	Digitalization-performance correlation r	Error variance	Study weight (W)
Frederico et al. (2023)	CA	SCP	0.31	0.26	0.36	115	0.92	0.29	0.01	97.96
Mora-Monge et al. (2023)	CA	CP	0.61	0.56	0.66	175	1.00	0.61	0.00	176.71
Zhao et al. (2023)	CA	SCP	0.51	0.46	0.56	210	1.02	0.52	0.00	217.36
Dubey et al. (2023)	CR	SCP	-0.04	-0.09	0.01	203	1.00	-0.04	0.00	203.00
Zhang et al. (2023)	CR	IP	0.36	0.31	0.40	383	1.04	0.37	0.00	416.23
Chen et al. (2023)	CA	FP	0.47	0.42	0.52	336	1.01	0.47	0.00	341.77
Chatterjee et al. (2023)	CA	CP	0.36	0.31	0.41	712	1.04	0.37	0.00	762.86
Yu et al. (2023)	CR	OP	0.47	0.42	0.52	113	1.01	0.47	0.01	114.85
Patil et al. (2023)	CA	FP	0.56	0.52	0.61	208	1.00	0.56	0.00	207.54
Argyropoulou et al. (2023)	CR	SCP	0.48	0.43	0.53	66	1.02	0.49	0.01	68.19
Li, Liu et al. (2023)	CA	CP	0.53	0.48	0.57	232	1.03	0.54	0.00	245.15
Enrique et al. (2022)	CA	OP	0.25	0.20	0.30	379	1.02	0.25	0.00	392.07
Wang et al. (2022)	CR	CP	-0.04	-0.08	0.01	229	0.98	-0.04	0.00	218.29
Zhu et al. (2022)	CA	CP	0.62	0.57	0.67	196	1.00	0.62	0.00	196.00
Ye et al. (2022)	CA	SCP	0.58	0.53	0.63	175	0.99	0.58	0.00	173.03
Nayal et al. (2022)	CR	SCP	0.15	0.10	0.20	361	1.01	0.15	0.00	365.58
Rajala et al. (2023)	CR	OP	0.00	-0.05	0.05	192	0.99	0.00	0.00	187.48
Lerman et al. (2022)	CR	CP	0.33	0.28	0.38	473	1.01	0.33	0.00	477.83
Ganbold et al. (2021)	CR	OP	0.20	0.15	0.25	108	1.06	0.21	0.01	120.25
Yu et al. (2021)	CA	FP, OP	0.39	0.34	0.44	296	0.98	0.39	0.00	286.02
Pattanayak et al. (2020)	CA	SCP	0.72	0.68	0.77	214	1.01	0.73	0.00	216.63
Ali et al. (2020)	CA	FP	0.36	0.32	0.41	330	0.97	0.35	0.00	311.29
Ali et al. (2019)	CA	SCP	0.43	0.38	0.48	330	0.97	0.42	0.00	310.81
Beka Be Nguema et al. (2021)	CA	SCP	0.42	0.37	0.47	177	0.98	0.41	0.00	169.39
Bharadwaj et al. (2007)	CA	OP	0.08	0.03	0.13	126	1.11	0.09	0.00	155.45
Braojos et al. (2020)	CA	FP	0.20	0.15	0.25	151	1.00	0.20	0.01	151.00
Cenamor et al. (2019)	CR	CP	0.21	0.16	0.26	129	0.99	0.21	0.01	127.64
Chang et al. (2013)	CR	SCP	0.61	0.56	0.65	108	1.02	0.62	0.01	112.21
Chi et al. (2018)	CR	IP	0.54	0.49	0.59	184	1.00	0.54	0.00	184.00
Chong et al. (2014)	CR	IP	0.57	0.53	0.62	256	0.99	0.57	0.00	250.11
Devaraj et al. (2007)	CA	OP	0.09	0.04	0.14	120	0.92	0.08	0.01	102.47
Fosso Wamba et al. (2020)	CA	SCP	0.87	0.82	0.91	738	0.97	0.84	0.00	692.66
Frohlich et al. (2002)	CA	SCP	0.43	0.38	0.48	485	1.05	0.45	0.00	531.75
Gawankar et al. (2020)	CA	FP, CP, IP	0.53	0.48	0.58	380	1.07	0.57	0.00	435.12
Gu et al. (2017)	CR	FP	0.29	0.24	0.34	220	1.06	0.31	0.00	246.19
Hensen et al. (2020)	CA	IP	0.22	0.17	0.27	1028	1.00	0.22	0.00	1028.00
Iyer et al. (2009)	CR	FP, CP, OP	0.25	0.20	0.30	152	1.05	0.26	0.00	168.89
Kim et al. (2009)	CA	CP	0.41	0.36	0.46	184	1.02	0.42	0.00	192.46
Liu et al. (2015)	CA	CP	0.45	0.41	0.50	261	1.00	0.45	0.00	258.99
Liu et al. (2016)	CA	FP, OP	0.45	0.40	0.49	196	0.94	0.42	0.00	174.47
Rai et al. (2006)	CA	FP, OP	0.23	0.19	0.28	110	0.99	0.23	0.01	107.28
Rai et al. (2010)	CR	CP	0.34	0.29	0.39	318	1.00	0.34	0.00	318.00
Ranganathan et al. (2011)	CA	CP	0.74	0.69	0.78	176	1.01	0.74	0.00	177.85
Shee et al. (2018)	CA	FP, SCP	0.60	0.55	0.65	105	0.91	0.55	0.01	87.39
Sundram et al. (2018)	CA	OP	0.53	0.48	0.58	250	1.00	0.53	0.00	247.82

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Appendix 1 (*continued*)

Study	The use of digitalization	Type of performance	Corrected correlation r ¯c	CI 95 % Lower bound	CI 95 % Upper bound	Study sample size (N)	Attenuation factor	Digitalization-performance correlation r	Error variance	Study weight (W)
van der Vaart et al. (2012)	CA	OP	0.00	-0.05	0.05	145	1.00	0.00	0.01	145.00
Vanpoucke et al. (2017)	CA	OP	0.13	0.08	0.18	563	1.00	0.13	0.00	561.78
Vickery et al. (2003)	CA	FP	0.23	0.18	0.28	57	0.82	0.19	0.02	38.06
Wiengarten et al. (2015)	CA	FP	0.16	0.11	0.20	637	0.99	0.15	0.00	625.60
Wong et al. (2015)	CA	OP	0.21	0.16	0.26	188	1.07	0.22	0.00	213.85
Wong, Lai, Cheng et al. (2015)	CR	CP	0.54	0.49	0.59	188	1.03	0.56	0.00	199.75
Yang et al. (2019))	CR	SCP	0.58	0.53	0.63	384	0.99	0.58	0.00	376.83
Yu et al. (2020)	CA	FP, OP	0.39	0.34	0.44	296	0.99	0.39	0.00	290.93
Zhang et al. (2016)	CA	SCP	0.21	0.17	0.26	320	0.98	0.21	0.00	307.85
Zhu et al. (2020)	CR	CP	0.41	0.37	0.46	196	1.01	0.42	0.00	200.94

CR=Value creation; CA=value capture; OP=operational performance; FP=Financial performance, CP=Competitive performance; IP=Innovation performance; SCP=supply chain performance

Data availability

Data will be made available on request.

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