Title: Theories of Digital Platforms for Supply Chain Management: A Systematic Literature Review

Purpose: Digital platforms transform supply chains. However, no unified theoretical understanding of digital platforms exists. Thus, the underlying research aims at investigating platform theories for supply chain management tasks.

Design/methodology/approach: The authors conduct a systematic literature review to identify relevant theories in the context of digital platforms and synthesize the respective findings for supply chain management tasks.

Findings: In total, 43 papers and 41 different relevant theories are identified. The most prominent theories are the resource-based view, transaction cost economics, internalization theory, and the dynamic capabilities approach. Digital platforms alter and change the boundary decisions of firms. Therefore, they have various implications for supply chain management tasks such as make-or-buy decisions or the orchestration of resources to sustain a competitive advantage.

Originality/Value: The conducted systematic literature review provides a first starting point for building a holistic theoretical approach to digital platforms in supply chains. Thus, the paper contributes a missing link for discussing digital platforms and their theoretical foundations for supply chain management tasks.

Practical implications: The identified supply chain theories as well as platform theories and their overlap provide a meaningful starting point for discussing and developing new and platform-based supply chain management approaches in the B2B domain.

Keywords: Systematic Literature Review, B2B Platform Boundary Decisions, Platform Theory, B2B Supply Chain Platforms

1. Introduction

Supply chain managers are developing an increasing interest in digital platforms as supply chain management tasks can be organized and facilitated by digital platforms more efficiently (Wang et al. 2013; Kathuria et al. 2020; Eloranta and Turunen 2016; Ivanov et al. 2022). Thereby, complex supply chains benefit from digitalization and the respective monetization of data via digital platforms (Haddud et al. 2017; Gerrikagoitia et al. 2019). Although, there is a broad consensus that digital platforms and related technologies offer great potential for improving supply chain management tasks (Adner 2017; Eloranta and Turunen 2016; Weking et al. 2020; Rejeb et al. 2021), successful B2B platforms in comparison to their B2C or C2C counterparts are scarce. Therefore, best practices for firms that wish to build their own B2B-related platform business models in a complex supply chain context are hard to find (Anderson et al. 2022). However, digital platforms for supply chain applications may differ fundamentally from their counterparts in the end-customer segments, as industry supply chains are characterized by much greater complexity (Hein et al. 2019; Marzi et al. 2023). In addition, and related to the lack of practical examples, a unified theoretical understanding of the "why" and "how" of digital B2B platforms and their implications for supply chain management seems to be missing as well. However, in the light of the absence of best practices, such a theoretical foundation could provide a valuable and alternative starting point for practitioners for building or using B2B platforms: Specifically, theories help to derive managerial strategies and allow the transfer of observed principles and their adoption in other fields (Davis and DeWitt 2021). Thus, a profound theoretical understanding of digital platforms could help implement platform logic within a practical supply chain context. Although some papers apply existing theories to explain digital platforms in an industry-specific context or develop their own theorems, a general, systematic overview of why and when to apply which theory, is missing. Such a review could help to develop a more unified understanding of digital platforms and their impact on supply chain-related tasks. In addition, such a review contributes to the formulation of new research agendas in the field of supply chain management. To the author's knowledge, such a systematic review of theories related to digital platforms does not exist.

Therefore, the underlying paper aims to answer the following research questions: What are the existing theories in the context of digital platforms and how do they contribute to the understanding of digital platforms? How can these theories help to understand the impact of digital platforms on supply chain management tasks?

To answer the posed questions and enhance the theoretical understanding of digital platforms and the respective implications for supply chain management, the paper conducts a systematic literature review (hereafter SLR) and thereby proceeds as follows: First, the paper provides a brief introduction to the general literature on digital platforms and supply chain platforms leading to the identification of the problem formulation. Second, an overview of the methodological approach of the SLR is presented. In the next step, the SLR concerning existing theories of digital platforms is conducted. Based on the

findings, the paper discusses the most popular theories and their explanatory power for digital platforms. Then, the paper briefly introduces a link between the identified theories and their implications for supply chain management tasks. Based on this, the paper discusses the resulting implications of digital platforms for supply chain management tasks. Finally, the paper concludes with a call for further research.

2. Understanding of digital platforms and problem formulation

At a general level, digital platforms enable transactions between different market participants that would not have been possible otherwise due to e.g., information asymmetries or high search costs. Thus, digital platforms create value based on the interaction of the platform users (Reuver et al. 2018). Digital platforms can be considered as two-sided or multi-sided, depending on how many market sides they connect. Two-sided platforms connect two different market sides, such as buyers and suppliers, while multi-sided platforms allow for the integration of complementary suppliers as additional market sides (Trabucchi and Buganza 2020). In both cases, the users benefit from direct and indirect network effects that ensure positive rates of platform growth (Parker and van Alstyne 2005; Katz and Shapiro 1985; Gawer 2021).

Based on Gawer (2021) and Cusumano et al. (2019), digital platforms can be divided into two distinguished types of platforms and their respective mixed form: transaction platforms, innovation platforms, and hybrid platforms that contain elements of both types. In general, transaction platforms facilitate the exchange of goods, services, and information between different market sides (Gawer 2021). In a supply chain context, transaction platforms could for instance be IoT- and visibility platforms that share supply chain data or depict digital twins (Abideen et al. 2021; Kalaiarasan et al. 2022), supply chain finance platforms that enable automated payments (Gomber et al. 2017), or freight exchange platforms connecting forwarders and carriers (Miller et al. 2020; Herold et al. 2023). Innovation platforms, however, create value by providing technological building blocks enabling a joint innovation process among different actors. Examples of innovation platforms in supply chain management include platforms that provide open source software and respective development environments (Randhawa et al. 2018; Boehmke and Hazen 2017) or additive manufacturing platforms (Bogers et al. 2016; Kurpjuweit et al. 2021). Based on these technological building blocks, other firms can provide complementary products and services adding value to the initial product (Ghazawneh and Henfridsson 2013). Hence, platform providers do not only provide technological infrastructure but also become orchestrators of entire ecosystems (Hilbolling et al. 2019; Ghazawneh and Henfridsson 2013).

Despite the acknowledgement that digital platforms, in combination with new technologies like artificial intelligence or blockchain, offer great potential for supply chains from a performance- and efficiency perspective, B2B platforms still face several challenges and fail to benefit from network effects compared to their B2C or C2C counterparts (Anderson et al. 2022; Durach et al. 2021). Digital platforms in the industrial context are primarily concerned with high complexity (Hein et al. 2019), lack of

standardization, mistrust (Anderson et al. 2014), and legal provisions, as well as a lack of digital compatibility and competencies among supply chain partners (Cichosz et al. 2020; Winkelhaus and Grosse 2020). Still, platform strategies and business model concepts for practitioners in the B2B domain are derived from B2C and C2C examples, as examples from the B2B field are scarce (Anderson et al. 2022). However, due to the potential misfit, alternative approaches are required to support practitioners in implementing B2B platform solutions. Given the lack of empirical evidence, a look into the theoretical foundations may be helpful. As indicated by Davis and DeWitt (2021), theories provide a valuable ground for management approaches. Thus, it may be worthwhile to consider the respective theoretical foundations of digital platforms (Anderson et al. 2022; Reuver et al. 2018). However, there seems to be a lack of theory-building in the platform literature as well (Anderson et al. 2022). Whereas digital platforms and their functioning principles such as network effects (Parker and van Alstyne 2005) or economies of scale (Baldwin and Woodard 2008), platform competition (Cutolo and Kenney 2021), and behavior of complementors and users (Boudreau and Jeppesen 2015; Hilbolling et al. 2021) are well-described, a full theory of digital platforms is still absent.

The lack of theoretical derivation for empirical work concerning digital platforms is also shown by a short preliminary search conducted by the authors prior to the intended SLR. The authors wanted to ensure that no other SLR regarding theories in the context of digital platforms has been conducted. For this purpose, three different databases (JSTOR, Web of Science, and Scopus) have been consulted, regardless of the publication date or whether the paper is a journal or conference paper. As these three databases only provided a small number of hits for different combinations of the search terms “Digital Platform” or “Digital Ecosystem” and “Systematic Literature Review” and “Theories”, Google Scholar was consulted additionally. However, none of the screened papers seem to provide a comprehensive SLR of digital platforms and their underlying theories, whereas SLRs on specific platform topics exist. For instance, Suuronen et al. (2022) perform a general SLR on digital business ecosystems in manufacturing industries but neglect their theoretical foundations. Setzke et al. (2019) apply a SLR in order to investigate different concepts of platform openness and Mallon (2021) investigates platform business model components with the help of a SLR. However, Senyo et al. (2019) conduct a SLR with respect to digital business ecosystems, and the according research themes, methods but also applied theories, and existing research gaps. Senyo et al. (2019) find that around 72 % of the 101 identified papers did not use any theory at all.

In sum, there still seems to be a missing theoretical foundation of digital platforms hindering a deeper understanding of how digital platforms can be designed in a B2B context and change supply chain management. The scope of the intended SLR is therefore to provide this missing link by identifying theories that help to explain digital platforms and allow for derivation of implications for supply chain management tasks.

3. Methodology and research design

In order to retrieve a methodologically profound overview of existing theories in the context of digital platforms, a SLR is conducted using methods from Durach et al. (2017), Webster and Watson (2002), and Seuring et al. (2021). In general, a SLR can be understood as a tool to analyze and synthesize the existing body of literature (Webster and Watson 2002). In specific, the research design follows the six steps of Durach et al. (2017, p. 70).

To define the research questions (Step 1), the authors follow the observation above that theoretical grounding for digital platforms and therefore the theory-based transferability into the B2B domain of supply chain management seems to be missing. Consequently, the authors pose the following two research questions:

RQ 1: What are the existing theories in the context of digital platforms and how do they contribute to the understanding of digital platforms?

RQ 2: How can these theories help to understand the impact of digital platforms on supply chain management tasks?

In a second step, the following, inclusion criteria are defined (Step 2): Only peer-reviewed journal papers in English language published during the period 2012 until 2021, as there were the most publications observable, are considered.[1] To limit the results, only papers from the categories "Economics", "Business Economics", and "Management" are retrieved. This is justifiable as economic theories provide the ground for the theoretical foundations of supply chain management (Gligor et al. 2019; Swanson et al. 2017; Touboulic and Walker 2015). Moreover, most databases do not provide separate categories for "Supply Chain Management" or "Logistics".

Subsequently, suitable databases and keywords are selected (Step 3). The authors chose JSTOR, Web of Science, and Scopus as they provide the majority of peer-reviewed journals within the context of economics and business economics, and supply chain management (Seuring et al. 2021; Kraus et al. 2020). The authors applied the following search string: (((Platform) OR (Ecosystem)) AND (Digital)) AND (Theory). The authors decided not only to search for digital platforms but also for digital ecosystems as especially innovation platforms often result in digital ecosystems. Hence, the terms are often used synonymously, and the respective literature is intertwined (Gawer 2021; Hilbolling et al. 2019; Jacobides et al. 2018). In addition, the terms "Supply Chain" or "Supply Chain Management" were added to directly specify the respective domain. However, this led to poor results. Therefore, the original search string was applied. To retrieve a sample, the above-mentioned inclusion criteria were applied, and papers were selected by title and then abstract if they mentioned a meaningful combination of the search terms.

[1] The sample set was retrieved in January 2022.

The selected papers were read and coded by one of the authors and two additional research assistants to retrieve a subset (Step 4). Coding categories were database, author, year, title, abstract, type of article, method, application theme, and the theories mentioned. To allow for a final selection serving the purpose of this study, and to identify meaningful theories, the authors assessed whether a paper provided a full theory or not. To evaluate the suitability, the authors followed Seuring et al. (2021) and Wacker (2008) who explain that a "full" theory, has to provide definitions explaining the "who and what", specify the boundaries and limitations, respectively, the "when and where", the relationships among the definitions meaning the "how and why", and allows predictions in the sense of "should, could, and would" (Wacker 2008; Seuring et al. 2021). Consequently, not all theories that are labeled as such can be understood as true scientific theories. One example is game theory: It is labeled as a theory; however, game theory is rather a mathematical model than a full theory, even though it is applied to model economic theories. Papers, that claim to use game theory or collective terms such as "economic theories" or "theories of the firm" were therefore excluded. Papers in the final selection were read thoroughly again. To be part of the final selection, the papers had to discuss or provide a "full" theory and apply it to explain or describe digital platforms. In case of ambiguity, the authors decided to include the theory in the final sample rather than exclude it. Papers that only mentioned a theory once and did not use it in the further process were not considered. In order to enlarge the sample set, for- and backward research (Webster and Watson 2002) was conducted, identifying four additional, highly relevant papers that were mentioned in more than one paper from the initial sample.

4. Results

In total, 43 papers were selected. Table I summarizes the literature retrieval process.

Insert Table I here.

Thereby, the identified papers in the final set use several theories. Many theories that are counted as individual theories are connected (e.g., internalization theory and OLI theory). However, the authors decided to count these theories, if possible, as individual theories to show the range of theories used in the context of digital platforms. The identified theories are shown in Table II and explained in further detail in the following.

4.1 Overview of identified theories

In total, 41 different theories were identified which is almost the same number as selected papers. Given the complexity of the topic of digital platforms, this seems to be intuitive. Most of the authors apply at least three and sometimes even more theories (see Table II). Moreover, eight papers develop their own theory that seems to fulfill the criteria of Wacker (2008) by either using e.g., mathematical modeling or following inductive, deductive, or abductive reasoning.

Insert Table II here.

Among the theories used, the resource-based view is the most prominent theory, followed by transaction cost economics, internalization theory, and dynamic capabilities theory. All these theories can be part of the theory of the firm, or theories of the new institutional economics. In addition, other groups of theories, such as network theories or psychological and behavioral theories, can be identified. Table III shows a suggestion for different groups of theories.

Insert Table III here.

The most dominant group of theories in the selected sample is the group of the theory of the firm with 37 %, followed by network and systems theories with around 19 %, and new institutional economics with 17 %. Although the individual network and systems theories did not reach high individual counts, they are quite dominant when seen as a group.

4.2 Theories in the context of digital platforms

For further analysis, the resource-based view (11 counts), transaction cost economics (7 counts), internalization theory (7 counts), and dynamic capabilities (4 counts), are discussed (Step 5). Apart from the highest frequencies in the sample set, these theories seem to be a good fit with respect to a later discussion of their implications for supply chain management tasks. The theories with three counts did not seem promising for a discussion with respect to supply chain management, and theories with two or only one count do not provide a nuanced range for discussion. The resource-based view is often used to lay theoretical foundations for explaining sourcing processes and supplier relationship management (Hitt 2011). Transaction cost economics, however, is a crucial theory for explaining internalizing versus externalizing decisions of the firm (Hitt 2011). Likewise, internalization theory helps to understand the market expansion of multinational firms and their respective supply chain coordination (Narula et al. 2019). Finally, dynamic capabilities help to understand why firms acquire competitive advantages through learning and possessing dynamic capabilities. Especially for supply chain management, this is an essential task, as most supply chains are subject to high volatility and external changes induced by e.g., new technologies that require continuous learning (Beske 2012).

4.2.1 Resource-based view and digital platforms

Mostly, the resource-based view is applied to explain aspects of platform performance or the role of network effects. In addition, the resource-based view is used to characterize specific resources and capabilities of digital platforms. For instance, Lou et al. (2021) incorporate the resource-based view to account for competence advantages such as technology, operation experience, training, and market-specific resources as explanatory factors for boundary decisions of digital platforms. Lou et al. (2021) find that platforms with high competence advantages, tend to pursue a make-strategy. Sedera et al. (2016) also apply the resource-based view to model and test the relationship between innovation creation, enterprise systems, and digital platforms. Specifically, Sedera et al. (2016) use the contingent resource-based view that allows for dependencies between resources and competencies such as primary and

complementary resources. Sedera et al. (2016) thereby hypothesize that the digital platform is the primary variable and enterprise systems serve as a complementary respectively contingent variable. The digital platform connects the different enterprise systems and transforms generated input into innovative output. Sedera et al. (2016) find that high and medium levels of enterprise systems platforms' performance allow innovation creation on digital platforms. Sedera et al. (2016, p. 374) show that "(…) capabilities emerge from the integration and combination of these resources". Kohtamäki et al. (2019) add that firms engaging in a platform business model, however, need specific resources themselves, to enable the creation of their platform. For instance, a strong brand name is a valuable resource. In addition, digital platforms possess certain capabilities to realize innovations. According to Randhawa et al. (2018), these are technological capabilities, and strong marketing capabilities linked to network effects. Another important resource for platform enterprises is an already installed user base. Platform firms that wish to grow, should search for markets that would benefit from their installed user base (Eisenmann et al. 2011). However, the extent to which the targeted actors can derive value from network effects depends on their individual capabilities (Afuah 2013). Consequently, networks will be more attractive to firms that possess those value-appropriating capabilities (Afuah 2013).

Davis and DeWitt (2021) add that even the existence of individual platform entrepreneurship in the face of diminishing firms can be explained by the unique resources those platforms possess. Davis and DeWitt (2021) argue that in light of easy access to technology, labor, capital, and production, a competitive advantage can be traced back to the individual entrepreneur's resources with respect to the ability to anticipate strategic opportunities. Those resources can also be organized outside the firm simply within the context of "entrepreneurship" (Davis and DeWitt 2021).

Besides the mentioned authors who use the resource-based view to describe resources that are specific for platform firms or platform users, some authors claim that the resource-based view is not applicable within the platform context. Among others, Karimi and Walter (2015) and Cui et al. (2021) refer to the criticism of the resource-based view as being static and only applicable for analyzing the behavior of a firm but not the behavior between various actors. Consequently, Cui et al. (2021) find the resource-based view to be a poor fit for analyzing the transformation from traditional intermediaries to platforms. Equally, Koch and Windsperger (2017) point out that the resource-based view may be inappropriate to describe digital platforms. The resource-based view assumes that firms gain competitive advantage through the possession of firm-specific valuable, rare, inimitable, and non-substitutable resources known as VRIN resources. Moreover, the environment of the firm is assumed to be relatively stable and shocks lead to new equilibria. However, digital technologies lead to a fundamental shift with respect to the stability of the environment, blur lines between industries, and alter the boundaries of the firm. According to Koch and Windsperger (2017), the ability of firms to maintain VRIN resources declines in the wake of the increasing complexity induced by the digital interconnectedness of firms, technology, and processes. Finally, Baronian (2020) also criticizes that the resource-based view fails to clearly define the boundary of the firm in the presence of digital platforms. Baronian (2020) argues that within the

resource-based view, the decision to integrate parts of the value chain is dependent on the benefit of appropriating a specific competence. However, digital platforms show that internalization is not required in order to benefit from competencies as firms can take advantage of the respective competencies and knowledge via digital platforms (Baronian 2020).

4.2.2 Transaction cost economics and digital platforms

The question of how to define platform firms' boundaries is also discussed within the context of transaction cost economics. Thereby, Baronian (2020) primarily covers the aspect of labor and argues that similar to the resource-based view, transaction cost economics is not suitable to explain digital platforms. Baronian (2020) states that transaction cost economics can explain why it is better to organize labor within a firm or in the market, using the example of classical putting-out systems. The putting-out system has failed due to high information asymmetry and moral hazard resulting in the favored, internal organization of labor through firms. However, digital platforms organize labor, not within a firm, but on the market by providing digital infrastructure allowing platforms to make a profit in the same way as "(…) merchant-coordinators were making profits on the individual entrepreneur's work" Baronian (2020, p. 217). Thereby, digital platforms can rely on both: coordination through the market but also coordination within the platform as a firm itself. Therefore, Baronian (2020) argues that digital platforms blur the lines between market and firm. Thus, according to Baronian (2020), transaction cost economics seems unable to fully explain the boundaries of the firm as the difference between market coordination costs and internal costs is practically equitable. Rather Baronian (2020) views a digital platform as a hybrid form between firms and the market.

Unlike Baronian (2020), Hennart (2019) does not find that the overcoming of the classical putting-out system and its problems by digital platforms contrasts with transaction cost economics. Quite on the contrary, Hennart (2019) argues that transaction cost economics can fully explain the concept of franchising, which is, equal to digital platforms, a hybrid form between market and firm. Unlike conventional enterprises that engage in franchising, digital platforms do not need contracts or on-site quality control but can establish control mechanisms by deploying technological digital means.

Equal to Baronian (2020), Jacobides et al. (2018) claim that transaction cost economics is not suitable as a theoretical basis for digital ecosystems. Jacobides et al. (2018) theorize that digital platforms and their respective ecosystems can be defined by the offering of complementary products by various stakeholders and their dependencies. While generic complements can be coordinated through the market, unique complements are often subject to make-or-buy decisions of firms. To avoid high transaction costs and vendor lock-ins, firms tend to coordinate production within their own boundaries rather than on the market. However, digital platforms manage to coordinate both, generic and specific complements in production and consumption alike. Though, in transaction cost economics the focus lies on specific complements in production (Jacobides et al. 2018). Furthermore, Jacobides et al. (2018) conclude that digital platforms do possess some coordination mechanisms but do not require hierarchical governance.

Rather, digital platforms use standards to define the various roles of actors and provide tools allowing these actors to freely decide on their economic actions. Consequently, the platform perspective accounts for a fundamental shift in the mode of analysis: not dyadic relationships but various relationships at the same time are the center of reflection (Jacobides et al. 2018).

However, Lou et al. (2021) do not question whether transaction cost economics is a suitable theory to explain digital platforms or not. Lou et al. (2021) use transaction cost economics to explain make-strategies of digital platforms in the light of asset specificity and information asymmetry. High asset specificity can lead to a lock-in-problem between two parties resulting in make-decisions by the firm. Likewise, in light of high information asymmetry and to avoid moral hazard, firms also pursue make-strategies (Lou et al. 2021). Drawing on a sample of 21 case studies, Lou et al. (2021) find that digital platform enterprises also pursue make-strategies when asset specificity and information asymmetries are high.

Following a different approach towards theory application, Kohtamäki et al. (2019) investigate digital servitization business models, including digital platforms. Thereby, Kohtamäki et al. (2019) note that delivering smart solutions within the service supply chain comprises transaction costs due to upstream interactions of the actors involved. Thus, digital platforms provide value, as they reduce transaction costs (Kohtamäki et al. 2019; Vakeel et al. 2021).

Another perspective is added by Davis and DeWitt (2021), who ask what would happen if transaction costs respectively costs of using the market went to zero. Due to digital platforms, Davis and DeWitt (2021) observe that firms have no need to internalize production as search costs are low, and international availability of vendors is high. Likewise, labor can be easily organized outside the firm based on digital platforms and their control mechanisms. Consequently, firms as a coordination mechanism tend to disappear, as proven by fewer firms going public, shorter life expectancy, and a declining number of employees (Davis and DeWitt 2021). Through this logic, Davis and DeWitt (2021) indirectly show that transaction cost economics can be applied to explain the consequences of digitalization on markets and traditional firms resulting in the emergence of digital platforms.

4.2.3 Internalization theory and digital platforms

Internalization theory is concerned with the activities of multinational firms and the question of how to internalize foreign market activities. Thereby, Banalieva and Dhanaraj (2019) elaborate on how digital platforms alter the assumptions internalization theory makes about firm-specific advantages in foreign markets. Firm-specific advantages describe specific knowledge bundles that are embedded within the organization and lead to a competitive advantage. If problems of knowledge transferability and potential appropriability hazards arise, multinational firms internalize foreign markets. Banalieva and Dhanaraj (2019) suggest that firm-specific advantages can be decomposed into technological assets that are either core- or peripheral assets and into human capital that can be advanced or generic. Thereby digital platforms organize these assets and change traditional concepts of how knowledge can be transferred within

organizations. Multinational corporations no longer need to internalize knowledge or assets, but they can expand via digital platforms and reach international customers directly (Nambisan et al. 2019). In addition, platforms provide application programming interfaces that allow easy integration of partners, local facilities, and other platforms. Consequently, knowledge flows are organized quite differently than through traditional acquisitions or the posting of employees (Banalieva and Dhanaraj 2019). Moreover, Nambisan et al. (2019) add that actors are independent but guided through standards that the platform enterprise sets. While multinational corporations still need advanced human capital and will bring it into foreign markets, companies can organize generic human capital outside the firm via digital platforms (Banalieva and Dhanaraj 2019). In addition, Stallkamp and Schotter (2019) note that an installed user base constitutes a firm-specific advantage for digital platform enterprises. Moreover, while digital platforms can externalize value creation through network effects, they still internalize key activities (Nambisan et al. 2019; Stallkamp and Schotter 2019). Thereby, platforms should distinguish between non-location-bound and location-bound firm-specific assets when pursuing international expansion. Location-bound firm-specific advantages lead to a differentiated network where local partners or subsidiaries meet the requirements of the respective customers (Nambisan and Luo 2021).

So far, the mentioned authors do not find that digital platforms contradict internalization theory but rather that they enhance the theory and show how multinational corporations become digital platforms recognizing network advantages to be an important resource for internationalization. However, Hennart (2019) criticizes Banalieva and Dhanaraj (2019), claiming that the existing internalization theory is sufficient to explain digitized service multinational corporations respectively digital platforms and that the phenomenon is not new nor does it serve as a foundation for extending the theory. Among others, Hennart (2019) finds that network effects are not a firm-specific advantage but rather a characteristic and inherent nature of the specific industry.

Adding a different perspective, Zeng et al. (2019) state that internalization theory cannot account for the activities of multinational multi-sided platform companies and their strategic advantages. Among others, Zeng et al. (2019) note that in the context of internalization, multinational corporations tend to form strategic, closed, and centralized alliance networks opposing multi-sided platform enterprises that are highly dependent on market co-creation associated with a high degree of decentralization and uncertainty. Similar to Zeng et al. (2019), Li et al. (2019) call for a reconsideration of internalization theory in the context of digital platforms. Li et al. (2019) note that, unlike traditional multinational enterprises, digital platforms pursue an externalization logic instead of an internalization strategy in order to exploit firm-specific advantages. Unlike Stallkamp and Schotter (2019), Li et al. (2019) find this to be inconsistent with the basic assumptions of internalization theory. In addition, Li et al. (2019) argue that internalization theory focuses on the question of how multinational companies can efficiently govern value-adding activities in order to capture rents. In contrast, digital platforms focus on co-specialization, allowing complementors to leverage and alter the product in order to optimize it for their customer base (Li et al. 2019).

4.2.4 Dynamic capabilities and digital platforms

Closely linked to the resource-based view is the dynamic capabilities theory. While the resource-based view mainly focuses on the question of how to optimize the resources of a firm, the dynamic capability approach puts processes, competencies, and path-dependencies into the center of analysis (Teece et al. 1997). Karimi and Walter (2015) build on dynamic capabilities, to explain how traditional companies such as newspapers can transform into platform businesses. Thereby, Karimi and Walter (2015) investigate newspaper companies' resource-value-process factors that create so-called first-order dynamic capabilities. First-order dynamic capabilities are capabilities that lead to ordinary capabilities which are the basic capabilities a firm needs to pursue its value creation. Moreover, Karimi and Walter (2015) investigate the relationship between these capabilities and digital platform capabilities. Among others, Karimi and Walter (2015) identify financial and dedicated human resources, an innovation culture, and a multimedia mindset to be important drivers for first-order dynamic capabilities. Based on an empirical investigation stemming from a survey with 148 respondents, Karimi and Walter (2015) show that the higher the ability to reshape the resource base with respect to existing resource-process-value factors, the higher the ability to respond to digital platform business models. Thereby, first-order dynamic capabilities precede digital platform capabilities. Specifically, digital platform capabilities are capabilities that help to "unlock the community's collective wisdom" and "develop a range of digital noncore products" based on the various information available (Karimi and Walter 2015, p. 50).

Nambisan et al. (2019) add that the orchestration of platform participants can be viewed as a dynamic capability of multinational enterprises that successfully manage digital ecosystems. Digital platforms allow multinational firms to pursue new ways of knowledge creation and building relationships as a dynamic capability. Furthermore, Eisenmann et al. (2011) add that the management of the platform envelopment can be considered to be a dynamic capability of the platform firm. Envelopment thereby describes the entrance of one platform firm into another market by merging its functions with that of the other platform (Eisenmann et al. 2011).

Unlike the former authors, Koch and Windsperger (2017) cannot agree that digital platforms are an "extension" of the dynamic capabilities view. Quite on the contrary, Koch and Windsperger (2017) state that digital platforms challenge the inherent assumptions made by the dynamic capabilities approach. Among others, Koch and Windsperger (2017) claim that in the wake of increasing digitalization and connectivity, the dynamic capabilities of firms are no longer specific or unique. According to Koch and Windsperger (2017), firms can combine various resources based on digital tools that instantly create the same functions as dynamic capabilities. Therefore, dynamic capabilities "(…) may serve as a source of competitive advantage only in specific contexts" (Koch and Windsperger 2017, p. 20).

5. Theoretical implications of digital platforms for supply chain management tasks

The previous discussion shows that theoretical approaches toward digital platforms can be quite different. The identified theories are either applied as a basis for empirical testing or theories are challenged against the background of digital platforms. Some authors find that the theories fit well into a platform context and can explain the phenomenon of digital platforms, while others focus on the boundaries and limitations of the theories. To structure the findings, an overview is given in Table IV. The first column of Table IV includes the domain of interest which provides guidance on when the theory can be applied within the platform context. Moreover, the theories are mapped against the requirements of Seuring et al. (2021) for the categories "definitions", "variables, and causalities" as well as "boundaries and limitations" in the remaining three columns of Table IV. Definitions answer the question of what a digital platform is under the lens of the respective theory. The aspect of variables and causalities allows for asking how and why digital platforms operate and function (Seuring et al. 2021). Boundaries and limitations however point out shortcomings (Seuring et al. 2021). In the light of Chapter 4, boundaries and limitations are especially understood as contradictions with respect to the general applicability of the theory.

Insert Table IV here.

5.1 Theoretical foundations of supply chain management

In the following, the selected theories are reflected upon regarding their implications for supply chain management tasks. The primary domain of interest when applying the resource-based view in a supply chain context is the uniqueness of supply chain resources and capabilities leading to competitive advantages (Halldórsson et al. 2015). The resource-based view can be used to explain multiple strategic decisions such as supplier selection and supply chain collaboration as well as purchasing strategies (Halldórsson et al. 2015). Moreover, the resource-based view helps to understand that managers have to orchestrate resources in such a way that firms develop capabilities to sustain their competitive advantage. Thereby suppliers are a critical success factor of every firm as they provide knowledge, capabilities, and resources the firm does not possess on its own. Thus, the resource-based view offers, among others, the theoretical justifications for a profound supplier-relationship management balancing internal and external resources (Hitt 2011). In sum, supply chain management can be seen as the task of coordinating relational assets and resources (Halldorsson et al. 2007).

Transaction cost economics in the context of supply chain management is especially concerned with the make-or-buy decisions of firms and their implications for the supply chain (Halldórsson et al. 2015). Therefore, transaction cost economics lays the foundation for strategic decisions regarding supply chain structures, information sharing between multiple actors, formation of strategic alliances, direct investment strategies, and other contracting arrangements (Halldórsson et al. 2015). Thereby, transaction cost economics helps firms to decide whether to internalize supply chain activities or externalize their

activities through suppliers weighed against the internalization versus market costs (Hitt 2011). In addition, different institutional arrangements such as contracts or cooperation can be seen as a tool to reduce transaction costs such as uncertainty, opportunistic behavior, or lack of trust (Halldorsson et al. 2007). In conclusion, supply chain management can be viewed as the task of coordinating rights of disposal (Halldorsson et al. 2007).

Internalization theory deals with multinational firms and their global supply chain strategies, such as entry mode decisions or internal organizational design and governance of firms. Basically, internalization theory helps to understand when and how multinational firms invest in foreign markets (Narula et al. 2019). Generally, firms set their boundaries where further activities of internalizing markets are equaled by the costs of these activities. Moreover, firms chose the lowest-cost location for conducting those activities given a consideration of the linkages of all international activities. Finally, the growth dynamics of a company are defined by the process of innovation creation based on the research and development activities of the firm (Buckley and Casson 2009). The firm is viewed as a complex constituted by interdependent activities that are linked by knowledge flows and intermediate products. Consequently, the firm is not viewed as a pure function of production, but as a function of dividing labor and crucial activities such as research and development or marketing dependent on the various locations selected by their specific (e.g., price or location) advantages. Consequently, supply chain management can be viewed as the task of coordinating this "internal market" through the firm itself (Buckley and Casson 2009).

The dynamic capabilities approach is closely linked to the resource-based view, adding the perspective of dynamic environments and the question of how companies can sustain their long-term competitive advantage and foster supply chain performance in changing environments (Teece et al. 1997; Beske 2012). Important capabilities to respond to these changes are the ability of the company to learn and adapt as well as to change production processes (Beske 2012). Dynamic capabilities per se are firm-specific, however, dynamic supply chain capabilities concern the entire supply chain and their ability to mutually update and develop new capabilities facing current market challenges. Knowledge-assessing and co-evolution are thus important dynamic capabilities and drivers for supply chain performance (Clifford Defee and Fugate 2010). Thus, firms are dependent on internal dynamic capabilities and on the dynamic capability of the entire supply chain (Clifford Defee and Fugate 2010). Consequently, supply chain management as a task revolves around the optimization of both internal and network-related dynamic capabilities.

5.2 Theoretical implications of digital platforms for strategic supply chain management tasks

Understanding the theoretical basis of overarching, strategic supply chain management tasks and examining digital platforms through the lens of the same theories, allows for the derivation of implications for a digital platform-based supply chain management. The potential implications and predictions in light of Seuring et al. (2021) are highlighted in Table V. The implications are seen as the way how digital

platforms may change and question existing strategic supply chain management tasks identified in the previous section.

Insert Table V here.

6. Discussion

The underlying research shows that there are many different theories applied in a digital platform context. In the following, the findings are discussed and summarized (Step 6) to answer the two research questions. Considering RQ 1, it can be stated that especially theories of the firm are used to describe and explain digital platforms. In addition, network- and systems theories are used followed by theories of new institutional economics, psychological and behavioral economics theories, organization theories as well as innovation theories (see Table III). The breadth of the theoretical streams demonstrates the complexity of the phenomenon of digital platforms and shows that many different questions such as whether digital platforms are firms or not (Baronian 2020; Davis and DeWitt 2021; Hennart 2019; Baronian 2020), how they help to diffuse innovations (Brouthers et al. 2016), or how complementors and suppliers on digital platforms can use signaling (Kromidha and Li 2019; Tiwana and Bush 2014), to sustain their competitive advantages can be derived.

To limit the discussion and derive meaningful insights, the paper focused on four theories of the firm respectively new institutional economics. Thus, it is not surprising that those theories revolve around the question of how to define the boundary of the firm in a platform context and how digital platform firms can build a competitive advantage with respect to their resources and capabilities. The selected theories show that digital platforms erode traditional boundary decisions. Digital platforms reduce and even diminish transaction costs and can make resources, services, knowledge, and capabilities and their instant combination and reconfiguration available via the market mechanism (Karimi and Walter 2015; Davis and DeWitt 2021; Koch and Windsperger 2017). New forms of market arrangements and corresponding organization modes of supply chain activities emerge. Therefore, traditional boundary decisions and habits of firms are questioned such as the organization of labor or classical make-or-buy decisions. At the same time, digital platforms are not only a market arrangement respectively a hybrid form (Baronian 2020) but firms themselves that possess certain resources and face boundary decisions, too (Lou et al. 2021). Consequently, the application of the theories is manifold: On the one hand, the theories help to explain how digital platforms challenge and alter the necessity of organizing resources within the firm. On the other hand, the theories are applied to explain how digital platforms operate. Naturally, this leads to contradictions and the general discussion of whether the theories are appropriate or not.

Assuming that the selected theories have explanatory power in the context of digital platforms, they help to understand the impact of digital platforms on strategic supply chain management tasks. To answer

RQ 2, the platform perspective was merged with the supply chain perspective identifying various supply chain tasks that are affected by digital platforms (see Table V): In concrete, digital platforms under the lens of the selected theories change supplier-relationship management aspects (Kohtamäki et al. 2019; Anderson et al. 2022; Miller et al. 2020), as well as make-or-buy decisions of traditional firms (Jacobides et al. 2018; Eloranta and Turunen 2016; Bogers et al. 2016), questions of internalization in international supply chains (Banalieva and Dhanaraj 2019) as well as tasks concerned with supply chain performance (Vakeel et al. 2021; Abideen et al. 2021; Kalaiarasan et al. 2022). As digital platforms change the nature and operation mode of traditional firms, it becomes apparent why supply chain management as a task, experiences such a dramatic shift towards orchestration, management of digital networks, and digitalization as a service (Eloranta and Turunen 2016; Zhang et al. 2019; Winkelhaus and Grosse 2020). Digital platforms change the way how resources, relational assets, and disposal rights can be organized, distributed, and shared, and therefore do not only change structures of supply chains (e.g., direct shipping to customers or on-site production via additive manufacturing) but change the self-image of supply chain management and related tasks. Beyond the challenges digital platforms impose on traditional business models in supply chain management, they can also help to organize and facilitate digitalization and the interconnectedness of all stakeholders involved and create new opportunities (Mikl et al. 2021; Cichosz et al. 2020). Among others, it becomes comprehensible why fourth-party logistics service providers emerge and alter the classical logistics market by providing new platform solutions asserting pressure on classical third-party logistics service providers and their business models (Gruchmann 2022).

Beyond this general discussion of how digital platforms change the nature of supply chain management tasks, the elaborated theories could also provide guidance for managerial decision-makers on when to use and how to implement digital platforms. In summary, the theories indicate that digital platforms can be a valuable alternative to existing supply chain processes when the market costs of e.g., labor and other services and goods are equitable, and transaction costs are minimized (Davis and DeWitt 2021). Mostly, this is the case for generic goods and services as well as simple tasks (Davis and DeWitt 2021; Jacobides et al. 2018; Banalieva and Dhanaraj 2019). Moreover, digital platforms offer an alternative to acquiring knowledge and capabilities that the firm does not possess on its own. If this knowledge does not constitute a firm-specific advantage respectively can be organized outside the firm, digital platforms are a valuable resource (Nambisan et al. 2019). In addition, the resource-based view and the dynamic capabilities approach indicate that firms need certain resources and capabilities such as a strong network, digital skills, marketing skills, and the ability to understand and optimize network effects, if they want to engage in platform business models (Randhawa et al. 2018). The focus on these new skills as well as strategic alignment toward network optimization is a new task for supply chain managers.

7. Future directions of research

As the previous discussion has shown, three core insights within the context of digital platforms and the related theories can be derived from the underlying SLR: First, the synthetization of the literature shows that the discussion regarding the theoretical foundation of digital platforms is highly contradictory. The second insight is that, irrespective of the theoretical discussion, digital platforms appear to modify different aspects of supply chain management tasks, either by challenging existing firm boundaries or by enhancing supply chain performance, resulting in new structures of supply chains. Thirdly, the theoretical discussion indicates that, considering the changes resulting from the digital platforms, practitioners require support in designing B2B platform-based supply chain management strategies. In the following, the authors suggest several research questions that future research could build upon. Future research should focus especially on a B2B setting, in contrast to previous B2C or C2C research. The suggested research fields build upon each other, as first theory building must be advanced to allow for specific insights into supply chain management to retrieve sufficient knowledge for designing B2B management approaches. Potentially, some research questions could be handled in parallel, but especially for the derivation of new management approaches, the theoretical foundations with respect to B2B aspects need to be deepened.

Insert Table VI here.

8. Concluding remarks

The underlying paper contributes to the platform and supply chain management literature in the following ways: First, the paper provides a missing SLR with respect to the theoretical foundations of digital platforms and supply chain management tasks. Among others, the paper identifies 41 theories that are used to explain or are applied to digital platforms. Secondly, the paper analyzes the most notable theories. Thirdly, the paper reflects on the theoretical implications of digital platforms on supply chain management tasks. In this way, the paper provides a meaningful starting point for discussing and implementing new, platform-based supply chain tasks and opens the avenue for further research on that matter.

Thereby the conducted SLR and respective findings are subject to limitations: A SLR can be biased and is always dependent on the individual choices the researchers make (Durach et al. 2017). Although the authors tried to avoid biases by following the six steps of Durach et al. (2017), the retrieved sample is limited and interpretation is still subjective. Among other things, the limitation is given due to the choice of only including economic, business- and management-related papers. Moreover, the decision of whether a theory constitutes a full theory is also partly subjective, as is the synthesis of the findings. Given these limitations and the fact that only four theories were discussed in detail, it can be summarized that further SLRs and empirical work would be beneficial. This is necessary, as most of the existing literature deals with anecdotal evidence, single case studies, or data sets from the B2C- or C2C sector.

Thereby, digital platforms could especially help traditional B2B companies not only to create more efficient processes but also to organize and monetize values derived from data streams along those processes. However, to allow for adequate managerial decision-making, the respective theories need to be understood and eventually reassessed as they still serve as the current basis for strategy-building and have shaped management scholars for years. Firms need to learn about new strategies that help them manage the increasing global digitalization and interconnectedness depicted on digital platforms. Consequently, the reevaluation of different theory streams, the development of new approaches as well as empirical testing, and the resulting derivation of new management strategies for supply chains and B2B platform business models should be part of future research.

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Table I. Process of literature retrieval.

Search string	(((Platform) OR (Ecosystem)) AND (Digital)) AND (Theory)				
Inclusion criteria	Peer-reviewed journal papers only, English language, Period of 2012 – 2021, Field of economics, business economics, management				
Final selection criteria	The theory mentioned is a "full" theory following (Wacker, 2008; Seuring et al., 2021)				
Database	**Total hits**	**Final hits**	**Selected by title**	**Selected by abstract**	**Final selection**
JSTOR	31.828	859	36	11	4
Web of Science	2.653	177	31	16	12
Scopus	4.869	418	34	29	23
For- and backward search					4
Sum	39.350	1.454	101	56	**43**

Table II. Identified theories and authors.

Authors	Theory	Frequency
Afuah (2013); Baronian (2020); Cui et al. (2021); Davis and DeWitt (2021); Eisenmann et al. (2011); Karimi and Walter (2015); Koch and Windsperger (2017); Kohtamäki et al. (2019); Lou et al. (2021) ; Randhawa et al. (2018); Sedera et al. (2016)	Resource-Based View	11
Baronian (2020); Davis and DeWitt (2021); Hennart (2019); Jacobides et al. (2018); Kohtamäki et al. (2019); Lou et al. (2021); Vakeel et al. (2021)	Transaction Cost Economics	7
Banalieva and Dhanaraj (2019); Hennart (2019); Li et al. (2019); Nambisan et al. (2019); Nambisan and Luo (2021); Stallkamp and Schotter (2021); Zeng et al. (2019)	Internalization Theory	7
Eisenmann et al. (2011); Karimi and Walter (2015); Koch and Windsperger (2017); Nambisan et al. (2019)	Dynamic Capabilities	4
Nambisan and Luo (2021); Vakeel et al. (2021); Zeng et al. (2019)	Network Theory	3
Afuah (2013); Brouthers et al. (2016); Chen et al. (2019)	Social Network Theory	3
Brouthers et al. (2016); Koch and Windsperger (2017); Vakeel et al. (2021)	Structural Holes Theory	3
Sandberg et al. (2020); Torres Pena and Breidbach (2021)	Complex Adaptive Systems Theory	2
Sandberg et al. (2020); Shaw and Allen (2018)	Complexity Theory	2
Brouthers et al. (2016); Nambisan et al. (2019)	Internationalization Process Theory	2
Hennart (2019); Nambisan et al. (2019)	OLI-Theory	2
Klein et al. (2016); Spulber (2019)	Principal Agent Theory	2
Cui et al. (2021); Cutolo and Kenney (2021)	Resource Orchestration Theory	2
Koch and Windsperger (2017); Randhawa et al. (2018)	Service-Dominant-Logic	2
Kromidha and Li (2019); Tiwana and Bush (2014)	Signaling Theory	2
Anderson et al. (2014); Parker and van Alstyne (2005)	Theory of Two-Sided-Markets	2
Nambisan and Luo (2021)	Alliance Theory	1
Dunn et al. (2021)	Attribution Theory	1
Delgosha and Hajiheydari (2020)	Behavioral Reasoning Theory	1
Baronian (2020)	Contract Theory	1
Sedera et al. (2016)	Contingent Resource-based View	1
Brouthers et al. (2016)	Diffusion of Innovation Theory	1
Karimi and Walter (2015)	Disruptive Innovation Theory	1
Shaw and Allen (2018)	Ecology Theory	1
Hu (2019)	Endogenous Growth Theory	1
Mai and Liao (2021)	Expectancy Value Theory	1
Nambisan and Luo (2021)	Internal-Knowledge-Flow-Theory	1
Ojala et al. (2018)	International New Ventures Theory	1
Nambisan et al. (2019)	Knowledge-Based Theory of the Firm	1
Nambisan and Luo (2021)	Loose-Coupling Theory	1
Chen et al. (2021)	Mechanism Design Theory	1
Ojala et al. (2018)	Network Theory of Internationalization	1
Davis and DeWitt (2021)	New Institutional Theory	1
Davis and DeWitt (2021)	Organization Theory	1
Kohtamäki et al. (2019)	Organizational Identity	1
Cutolo and Kenney (2021)	Power Dependence Theory	1
Baronian (2020)	Property Rights Theory	1
Ojala et al. (2018)	Resource-Dependence Theory	1
Koch and Windsperger (2017)	Social Capital Theory	1
Delgosha and Hajiheydari (2020)	Explanation-Based Decision-Making	1
Koch and Windsperger (2017)	Theory of the Strength of Weak Ties	1
Eckhardt et al. (2018); Jacobides et al. (2018); Kathuria et al. (2020); Ojala et al. (2018); Parker et al. (2016); Srinivasan and Venkatraman (2018); Stallkamp and Schotter (2021); Wang (2021)	Own Theory	8
Sum excluding "Own Theory"	**41**	**81**

Table III. Suggested grouping of theories.

Suggested group of theory	Theories	Frequency of application	Percent
Theory of the Firm	Contingent Resource-Based View Dynamic Capabilities Internalization Theory Internationalization Process Theory Knowledge-Based Theory of the Firm OLI-Theory Resource-Based View Resource Orchestration Theory	30	37,0 %
Network- and Systems Theories	Complex Adaptive Systems Theory Network Theory Network Theory of Internationalization Social Network Theory Structural Holes Theory Theory of Two-Sided-Markets Theory of the Strength of Weak Ties	15	18,5 %
New Institutional Economics	Contract Theory Principal Agent Theory Property Rights Theory Signaling Theory Social Capital Theory Transaction Cost Economics	14	17,3 %
Psychological and Behavioral Economics Theories	Attribution Theory Behavioral Reasoning Theory Expectancy Value Theory Explanation-Based Decision-Making Loose-Coupling Theory Power Dependence Theory Resource-Dependence Theory Service-Dominant-Logic	9	11,1 %
Organization Theories	Internal-Knowledge-Flow-Theory International New Ventures Theory New Institutional Theory Organization Theory Organizational Identity	5	6,2 %
Innovation Theories	Diffusion of Innovation Theory Disruptive Innovation Theory	2	2,5 %
Others	Alliance Theory Complexity Theory Ecology Theory Endogenous Growth Theory Mechanism Design Theory	6	7,4 %
Sum	**41**	**81**	**100 %**

Table IV. Use of theories for digital platforms.

Domain of interest	Definition of digital platform	Potential boundaries and limitations	Variables and causalities
Resource-based View			
The resource-based view can be applied to explain the competitive advantages of digital platform firms due to their unique resources and capabilities. Moreover, the resource-based view helps to understand how digital platforms coordinate those resources through the market or within the firm.	Digital platforms are firms that possess specific resources and competencies such as the ability to realize innovation and manage networks allowing them to pursue their strategic goals and operate successfully through network effects.	In the light of unrestricted availability of resources due to digitalization, it is questionable whether firms can possess VRIN resources. Digital platforms show that internalization is not necessary to benefit from resources as they can be organized via the market. This challenges the resource-based view stating that firms internalize capabilities and resources to sustain a competitive advantage.	The performance and make-or-buy-decisions of platforms are dependent on specific resources such as the ability to manage a network. If digital platform firms possess specific and high competencies in a certain area and benefit from strong network effects, they pursue a make-strategy. Thereby, digital platforms provide resources and competencies for their users – who themselves need certain capabilities to benefit from network effects.
Transaction Cost Economics			
Transaction cost economics explains why digital platforms emerge because of digitalization. In addition, transaction cost economics helps to understand when to use digital platforms and when to remain within the boundary of the firm.	Digital platforms enable different institutional arrangements and can be viewed as a hybrid between firm and market. Digital platforms use the market and externalize. Yet, they are firms themselves that internalize respectively "make" certain activities.	In the light of digitalization, the difference between market coordination costs and internal costs is equitable. Thus, digital platforms blur the line between the market and firms. Transaction cost economics cannot specify the boundary of firms concerning digital platforms.	Digital platforms reduce transaction costs of using the market for their users and thus create new values due to network effects. Digital platforms are seen as firms pursuing make-strategies when asset specificity and information asymmetry are high.
Internalization Theory			
Internalization theory helps to understand when and how multinational firms appropriate knowledge and assets through digital platforms as an alternative to direct foreign investments.	Digital platforms possess firm-specific advantages and internalize key activities allowing them to engage in externalization of other value creation mechanisms through digital platforms.	Digital platforms oppose internalization theory, as their primary strategy is externalization. However, internalization theory deals with the question of how multinational firms capture rents through internalization while platforms create value through externalizing.	Generic human capital and standardized activities can be organized outside the firm via digital platforms, while multinational firms still must organize advanced human capital and location-bound activities in the foreign market directly.
Dynamic Capabilities			
Dynamic capabilities define the specific capabilities that firms need for transforming their business model into a platform solution. In addition, dynamic capabilities define the relations and hierarchies between different capabilities.	Digital platforms are firms that possess specific dynamic capabilities allowing them to engage in coordination, creation of non-core products, orchestration, and building network effects, leading to new values for their users.	Dynamic capabilities are not suitable to explain digital platforms as digitalization diminishes the uniqueness of dynamic capabilities. Digital platforms allow for the instant combination and reconfiguration of resources making firm-internal dynamic capabilities unnecessary for value creation. A competitive advantage cannot be based on unique dynamic capabilities anymore.	Firms pursuing platform strategies need certain dynamic capabilities such as the ability to orchestrate a network and anticipate the various needs of the users. The higher the ability to reshape the resource base concerning resource-process-value factors and first-order dynamic capabilities, the higher the ability to respond to digital platform business models.

Table V. Implications of platform theories for supply chain management strategies.

Application of theory w.r.t. supply chain management tasks	Potential implications of digital platforms for supply chain management tasks
Resource-based View	
The resource-based view lays the foundation for the task of orchestrating and managing unique resources such as supplier relationships to sustain a competitive advantage.	Digital platforms change the nature of supplier-relationship management: Due to digital platforms, firms can pursue different supplier arrangements that would otherwise not have been possible. Suppliers can be organized autonomously via the digital platform: Contracting or long-term relationships give way to new suppliers that place offers on the respective platform (e.g., freight exchange platforms). Moreover, companies can instantly benefit from resources by using their network of suppliers and complementary providers – they no longer need to incorporate these resources. As these external resources are easily accessible and automatically organized via digital platforms, existing supplier relationships as well as the idea of developing unique capabilities and maintaining VRIN resources are challenged. Thus, supply chain management strategists should focus on the question of how to sustain a competitive advantage and which resources still need to be internalized in the light of digital platforms. Moreover, firms need to ask how their respective supplier networks or their role as suppliers is altered.
Transaction Cost Economics	
Transaction cost economics explains the supply chain management task of make-or-buy decisions of firms and assessment of market arrangements such as contracting and outsourcing.	Digital platforms allow new control- and coordination mechanisms that question make-or-buy decisions. Firms can coordinate resources and disposal rights as well as labor efficiently via digital platforms and no longer need the classical frameworks of the firm itself for organizing these assets. This means firms will no longer be concerned with the question of whether to outsource processes or buy services and goods that they cannot produce themselves at cheaper costs but rather ask whether and how they can organize those activities via digital platforms. Digital platforms erode the boundary of the firm and change the structure of existing supply chains due to the possibility of new business models connecting market sides that would otherwise not have interacted. Consequently, managerial decision-makers should focus on the question of what constitutes their firm, what remains within the boundary of the firm, and how to design the supply chain accordingly. This could lead to an even higher specialization of firms while generic activities can be organized via digital platforms. Additionally, new business models can be created via digital platforms as they allow for instant trading, as well as the division and combination of disposal rights.
Internalization Theory	
Internalization theory is applied to explain internalizing decisions of multinational supply chain activities as a task to sustain firm-specific advantages.	Digital platforms alter the expansion decisions of multinational firms. Instead of e.g., franchising and the question of how to obtain country-specific advantages and the respective knowledge, firms can use digital platforms to reach new, foreign markets. Traditional, local activities such as building subsidiaries may become obsolete. However, firms still need to understand country-specific requirements and adapt the digital platform strategy accordingly. Firms should therefore use specialized competencies and knowledge in the respective market and internalize the required competencies to develop the platform market. Thus, supply chain managers should focus on platform design and understand the respective local network effects to benefit from platform activities in the foreign market.
Dynamic Capabilities	
The dynamic capabilities approach explains the task of optimizing supply chain performance – mutually and internally, through unique, dynamic capabilities.	Digital platforms allow for new organization modes of supply chains. However, this organization needs new dynamic capabilities. Consequently, there is a shift from supply chain-related dynamic capabilities towards platform and network-related dynamic capabilities. If firms possess these capabilities, supply chain managers can optimize the performance of their network respectively the supply chain via the digital platform on different levels. Digital platforms could enhance supply chain performance per se by allowing transparency, real-time information, or the integration of multiple suppliers and buyers facilitating exchange and easing all kinds of transactions. At the same time, digital platforms erode classical integration modes of horizontal or vertical supply chains and lead to new networks that are self-organized and operate much more autonomously and automated. Supply chain actors and partners are likely to be much more dependent on each other in a platform context and share a mutual interest in optimizing the network performance. Supply chain managers should therefore ask not only how to optimize supply chain performance, but also how to optimize network effects and ensure that the entire ecosystem benefits from the mutual activities.

Table VI. Potential directions of future research.

Research field	Potential research questions
Theory building	
General aspects of theories in the context of digital platforms	• Are there theories that are subject to more contradictions than others? • Are they contradictory or do researchers view the research object through a different lens? • What is the perspective of network- and systems theories on digital platforms? • What are other important theoretical streams? • Can other theoretical streams embrace and combine the conflicting perspectives? • Do the theories differentiate between end-consumer markets and industrial settings? • Which insights concerning the fundamental differences between B2B and B2C as well as C2C platforms can be derived from the theories?
General aspects of firm boundaries in the context of digital platforms	• Are B2B platform organized value-creation processes really that different from networks, alliances, and other well-known market arrangements? • If so, how do B2B platforms differ from traditional market arrangements? • What are the new tasks and central functions of firms in a platform economy: What are their societal and economic role, impact, and benefits? • What are the tasks and central functions of digital platforms: What are their societal and economic roles, impact, and benefits? • How can the new "boundaries" of firms be defined? • How can firms maintain VRIN resources and unique value propositions in the light of digital platforms and digitalization?
Impact of digital platforms on supply chain tasks	
Supplier-relationship management	• How can platforms in the field of supplier-relationship management be characterized and classified by e.g., taxonomies? • What kind of supplier activities should be organized via digital platforms and why? • Which industries, products or processes are suitable? • What are the challenges and prerequisites for participation in a digital platform economy for suppliers? • What are the selection criteria for suppliers on a digital platform? • How do different platform types change supplier competition and the respective industry? • What are suitable platform strategies for suppliers?
Make-or-buy decisions	• When and what kind of resources respectively value-adding factors such as capital, labor, and knowledge should be internalized by firms and why? • What are the classes and types of value-adding factors in the context of B2B digital platforms and supply chain management? • Are there specific supply chain activities that are especially suitable for externalization via digital platforms and how are traditional supply chains altered?
Internalization of multinational firms	• Which areas of internationalization activities are suitable for B2B platforms? • How and when can generic human activities and capital be coordinated via B2B platforms? • What are the respective challenges and prerequisites for that? • Which locations, industries, and cultures are more open to platforms compared to others? • What are specific human skills and capital that should still be internalized?
Supply chain performance	• How can platforms in the field of supply chain performance be characterized and classified by e.g., taxonomies? • What kind of internal and external capabilities are needed to increase performance via digital platforms? • How do optimization strategies in B2B digital platform ecosystems differ from existing supply chain strategies in traditional supply chain networks? • How can firms ensure that supply chain partners participate in a B2B platform ecosystem? • What are appropriate value-sharing mechanisms and respective motives for different B2B supply chain partners to participate?
New managerial tasks and practical guidelines	
General managerial aspects in the context of digital platforms	• How can B2B firms manage the transformation from traditional firm boundaries towards platform-defined boundaries? • How does this change and affect traditional roles and concepts of labor? • What are the specific platform competencies required for firms and their employees? • How could a B2B platform transformation management model look like? • What are criteria that help practitioners to take decisions whether to engage in a digital platform economy or not?
Competitive advantage and role of the firm	• How can firms maintain their competitive advantages in the light of digital platforms? • How does the focus on core strategic advantages change existing supply chain structures? • What are the design elements of the restructuring of the supply chain?

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