Managing supplier capabilities for buyer innovation performance in e-business

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Abstract

Purpose – The purpose of this paper is to analyze the connections between the capabilities of suppliers, buyer operations and the innovation performance of buyers in service-based supply chains. In particular, the authors use a construct of supplier capabilities comprising the capabilities needed to produce an online store and divided into capabilities related to the product, capabilities related to service delivery and capabilities related to the buyer-supplier relationship.

Design/methodology/approach – Data were collected with cross-sectional, random sampling from Finnish companies that have an active online store. A survey was used to collect data on managerial assessments of capabilities of a supplier, the operations of buyers and the innovation performance of buyers. Multiple regressions were used to test the hypotheses.

Findings – The results reveal that capabilities related to the buyer-supplier relationship are positively connected with the innovation performance of the buyer, but those related to the product and service delivery do not significantly influence the innovation performance of the buyer. The results show that the moderating influence of buyer operations on the relationship between capabilities related to the product and the innovation performance of the buyer is negative. The moderating influence of buyer operations on the relationship between capabilities related to service delivery and the innovation performance of the buyer is positive.

Research limitations/implications – Forming tight relationships with online store suppliers appears to be a successful way to attain innovation performance for online store operators. Online store operators should not expect supplier capabilities related to online store functionality and characteristics of online store delivery alone to improve their innovation performance.

Originality/value – Few studies use an e-business operations model to comprehend the role played by supplier capabilities in buyer innovation performance in service-based supply chains. Building on a resource-based view with inter-organizational management and e-business literature streams, the authors focus on three supplier capabilities and buyer operations to investigate their effects in terms of enhancing innovation performance.

Keywords Innovation, Service supply chain

Paper type Research paper

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1. Introduction

Increases in digitalization and service integration are among the largest transformations that have put supply chain management under a lot of strain recently (Lusch, 2011; Bag *et al.*, 2020). The distinctiveness of service-based supply chains is the role of buyers as both asset providers and receivers (Haque and Islam, 2018; Sampson and Froehle, 2006; Sampson and Spring, 2012; Sengupta *et al.*, 2006). In service-based supply chains, buyers engage in supplementary positions relative to traditional supply chains (Sampson and Spring, 2012), which makes them key players in the value creation process. Consideration will be given to how the relations between suppliers and buyers are enhanced, retained and controlled, especially in digitalized business environments. As a part of service-based supply chains, e-business processes are currently supporting collaboration activities and generating possibilities for economic payoffs by helping to overcome boundaries in supply chains through the use of organizational resources and capabilities (Xue *et al.*, 2013; Zhang *et al.*, 2016; Zhu *et al.*, 2020). This refers to the management of buyer-supplier relationships and is an important operative process for building tighter relations with central suppliers for the purpose of value creation (Andersen *et al.*, 2019; Autry and Golicic, 2010; Lambert and Schwieterman, 2012). The focus on these relationships is why the effectiveness of different information technologies and digital solutions for managing supply chains and value creation is receiving increasing interest from practitioners and academic researchers (Andersen *et al.*, 2019; Setia *et al.*, 2013; Xue *et al.*, 2013).

Thus, this study analyzes the connections among capabilities of suppliers, buyer operations and the innovation performance of buyers in service-based supply chains. Scholars have made significant contributions to the growing literature on service-based supply chains, also in the e-business context (Wang *et al.*, 2021; Zhu *et al.*, 2020) For example, Wang *et al.* (2021) explored the role of big data analytics in the coordination of electronic retail service supply chains and Zhu *et al.* (2020) examined process components and value creation mechanisms in e-business supply chain operations. However, studies on service-based supply chain innovation, especially in the e-business context, are limited. With an abundance of e-businesses, there is a need to comprehend how buyer-supplier relationships contribute to business value (Zhu *et al.*, 2015). While the focus of studies on supply chains has recently shifted from an operation-oriented to a strategy-oriented one, for example regarding capability leveraging (Shiau *et al.*, 2015; Zhu *et al.*, 2020), there is a need to further understand how organizations should focus and leverage their inter-firm resources and capabilities embedded in e-business processes to generate innovation performance (Zhu *et al.*, 2020). Without an understanding of how business value and innovations can be obtained from e-business processes in service-based supply chains, organizations have limited guidance when implementing e-business processes that promote digital supply chain innovation (Zhu *et al.*, 2020). To address this need, the study answers the following first research question:

RQ1. What is the role of supplier capabilities in terms of increasing the innovation performance of buyers in e-business-based, service-based supply chains?

Despite the recognized importance of understanding the factors supporting organizations' operations, studies that use an e-business operations model to comprehend the part that supplier capabilities play in buyer innovation performance in service-based supply chains do not exist. To address this need, the study answers the following second research question:

RQ2. Do buyer operations facilitate the link between supplier capabilities and innovation performance in e-business-based, service-based supply chains?

Building on the dynamic capabilities view with inter-organizational management and e-business literature streams, we focus on three supplier capabilities and buyer operations to investigate their effects in terms of enhancing innovation performance. In particular, we use a construct of supplier capabilities comprising the capabilities needed to produce an online store and divided into capabilities related to the product, capabilities related to service delivery and capabilities related to the buyer-supplier relationship. This construct is further used to build a theoretical framework to examine how the buyer (online store operator) leverages its supplier capabilities to create business value in terms of innovation performance. The theoretical model is tested with survey data from Finnish companies that have an active online store.

The remainder of the article is organized as follows: Section 2 discusses theoretical background and definitions of the key concepts are decomposed, and then the theoretical model and hypotheses development are discussed in Section 3. Next, the data collection, construct operationalization and data analysis processes are presented in Section 4, after which the research results are described in Section 5. Finally, theoretical and managerial contributions and the limitations and directions for further research are outlined in Sections 6 and 7.

2. Theoretical background

2.1 Theoretical underpinnings

The resource-based view builds on the premise that company competitiveness is dependent on firm-specific capabilities that contribute to firm effectiveness in general (Barney, 1991) and innovation performance in particular (Tarafdar and Gordon, 2007). According to Teece (2018), the resource-based view of firms is one piece of the process of bringing all such capabilities together for the achievement of competitive advantages. In addition to this, dynamic capabilities are necessary and complement the resource-based view in a way that tackles issues in dynamic environments. Thus, advocates of the resource-based view claim that it creates dynamic capabilities to handle issues in the current dynamic environment (Kim *et al.*, 2015; Lin and Wu, 2014; Teece, 2018). Companies with strong dynamic capabilities are more efficient with regard to forming, renewing and reconfiguring capabilities and resources to innovate and react to changes in the market environment (Teece, 2018). Innovation performance refers to a firm's capacity to renew via the application of novel knowledge acquired from both internal and external sources. Afterward, academia has focused on the knowledge gained outside a firm's boundaries and especially from suppliers, which have been proven to provide valuable competitive advantages through innovation (Cheng and Krumwiede, 2018; Johnsen, 2011; Kulangara *et al.*, 2016).

Innovation performance requires a prolonged orientation and the need to account for a variety of internal and external factors (Romijn and Albaladejo, 2002; Rosenbusch *et al.*, 2011). To generate this type of renewal, a firm must also pay attention to how it best contributes to the service process concerning its customers. The buyer's own operations can encourage this process. An important change in the buyer-supplier relationship has resulted from the rise of e-business (Randall *et al.*, 2011). However, within the context of e-business, these links have remained largely unexplored. Thus, this study focuses on the role of supplier capabilities in increasing the innovation performance of a buyer within the frame of e-business. In addition, the facilitation of buyer operations in the link between supplier

capabilities and innovation performance by the online store operator is considered. These terms are each defined, in turn.

2.2 Supplier capabilities

Little attention has been paid to the importance of supplier capabilities when studying online stores. In this article, we consider *supplier capabilities* as the ways in which suppliers engage with a buyer's operations by offering extensive input with regard to the procurement of a product or service. To benefit from supplier capabilities, elements such as the functionality of the supplied product/service, the attributes of the service delivery process and the fluency of the buyer-supplier collaboration must be considered (Blut *et al.*, 2015; Lee and Lin, 2005; Saunila *et al.*, 2017). Thus, while the product itself and its technology base are facilitators of value, the customer base should also be considered a priority for e-businesses (Oliveira and Roth, 2012a). This means considering the service process, for example, in terms of knowledge sharing, promise fulfillment and empathy (Saunila *et al.*, 2017; Haque and Islam, 2018) and examining relationships, for example, in terms of trust development (Corsten and Felde, 2005; Mitrega *et al.*, 2017).

2.3 Buyer operations

Buyer operations are also essential ingredients for enabling e-businesses to succeed with regard to their customers. These buyer operations enable the management of the digital process and information sharing (Zhu *et al.*, 2015). In this article, we consider buyer operations as the ways in which the online store operator serves its customers. This view of buyer operations highlights contact, responsiveness, flexibility, security and customization (Oliveira and Roth, 2012b) as important features for the buyer company to consider when operating the online store. This type of interaction permits customers to use the digital platform to order services and products online (Saunila *et al.*, 2019a). In this way, successful buyer operations are likely to result in a more efficient supply chain. Buyer operations are, thus an essential facilitator of supply chain effectiveness.

Next, we turn to the development of hypotheses that investigate how buyer innovation performance is driven by supplier capabilities and the moderating influence of buyer operations.

3. Hypotheses development

Figure 1 demonstrates the research framework directing the study. The framework suggests that supplier capabilities in terms of managing the online store production process offer the prospect of increasing buyer innovation performance. Supplier capabilities are reflected by the dimensions of product capabilities (constructing an online store), service

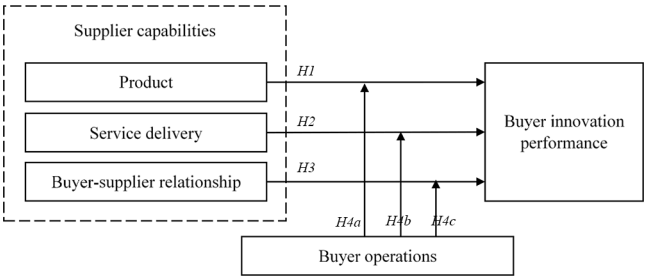

Figure 1.
Research framework

delivery capabilities (delivering an online store) and buyer-supplier relationship capabilities (maintaining a relationship with regard to the operation of the online store, i.e. the buyer company). Further, we argue that this perspective is encouraged by buyer operations (actions the online store operator takes to serve its customers). While supplier capabilities can help to increase buyer innovation performance, the buyer's own operations offer the fuel that enhances the supplier's influence on the buyer's way of obtaining renewal. Thus, an online store operator that lacks the appropriate mechanisms for dealing with its customers may not obtain increased innovation performance despite the supplier's capabilities in terms of producing the online store. Thus, it is argued that buyer operations offer a moderating mechanism that connects supplier capabilities and buyer innovation performance. Next, hypotheses are developed in the context of online store operations.

3.1 Supplier capabilities as antecedents of buyer innovation performance

Online platforms and sites have become fast-growing and important elements for reaching customers worldwide (Leung *et al.*, 2019). With the huge amount of data available from different operations conducted online (Leung *et al.*, 2019), suppliers are now more capable of supporting buyer operations regarding such platforms. From the infrastructure perspective, e-business platforms can be considered as products with certain characteristics that are necessary for the foundation of the platforms (e.g. online stores). According to Tsai *et al.* (2013), technology forms an inseparable part of these operator value chain activities. Online store functionalities provide buyers with easy and fast access to relevant and important information and enable knowledge transfer among suppliers, buyers and end customers (Aydiner *et al.*, 2019). Even though in most cases, it is easy for buyers to follow and imitate competitors' online operations (Aydiner *et al.*, 2019), there are elements related to the product/infrastructure side of online stores in which suppliers' capabilities play an important role in affecting online store operators' (i.e. buyers') performance (Najafi-Tavani *et al.*, 2018; Saunila *et al.*, 2019b).

As suppliers develop and provide online stores for different buyers and for different purposes, they gather knowledge and expertise related to online store functionalities, which were not previously available to buyers. This knowledge can be related, for example, to security issues, which have been shown to affect the appropriation of web-equipped business-to-business (B2B) e-commerce (Sila, 2013). Although sharing knowledge through platforms provides more benefits, there is also a risk of information linkage, which might result in unwanted results and for suppliers that are not prepared to tackle security issues, it is challenging to achieve competitive benefits (Ovuakporie *et al.*, 2021). In addition, supplier product capabilities can be related to a platform's usability, functionalities and system availability. Technological and product innovations, such as advanced business analytics, provide possibilities and methods that can offer buyers new processes and/or potential redesigns of existing methods (Ramirez *et al.*, 2010). As such, buyers incessantly look for means to renew and develop the end-user experience by updating their online platforms with novel features, for example, personalized imaging and interactive commerce (Tsai *et al.*, 2013). By using their product capabilities, suppliers can help buyers renew and update their online stores properly and boost buyer innovation performance (Zhu *et al.*, 2015). Based on the preceding elaboration, the following hypothesis is presented:

H1. Supplier capabilities regarding the product are positively connected with buyer innovation performance.

The benefits of e-business, when applied and integrated throughout supply chains (Bakker *et al.*, 2008; Choudhury *et al.*, 2021; Scuotto *et al.*, 2017) and the remarkable role of e-service in

effective customer service (Chuang and Lin, 2015) have been presented in the literature; the achievement of such benefits, value and innovations relies strongly on successful service delivery (Finne and Holmström, 2013). In other words, online platforms are not only about the delivery of technology but also about how service delivery processes are designed and adopted. Successful service delivery in e-business supply chains ensures that companies can realize the benefits of digitally enabled solutions, and thus support their renewal and innovation performance. As such, online platforms enable proper service delivery to develop collaboration among supply chain parties and to improve business performance (Zhu *et al.*, 2015).

According to Finne and Holmström (2013), providers of integrated solutions (buyers) are highly dependent on the specific expertise of their suppliers. In the frame of service-based supply chains in e-businesses, such buyers may have to rely on and use the different capabilities of their suppliers to fulfill service delivery and support the responsiveness of online platforms. These supplier capabilities can be described as learned means of delivering support for the implementation of planned e-customization for swift service delivery (cf. Aydiner *et al.*, 2019). Renewing companies' operations in terms of e-business needs supplier capabilities to provide value for customers through correct and updated information, high-quality and on-time delivery and different alternates in terms of the service process (Soto-Acosta and Meroño-Cerdan, 2008).

Because service delivery in e-business requires continuous platform updates and renewals, information updates and e-customization, a software supplier is required to develop the platforms and the required functionalities. To improve buyer innovation performance, suppliers need to understand the buyer's operations and possibilities regarding the developed platforms. On the other hand, the buyers need to be open to the possibilities provided by suppliers. Thus, platform suppliers also need to develop service delivery (Finne and Holmström, 2013; Galbraith, 2002) to successfully renew and update the platforms and support buyer innovation performance. Derived from the above discussion, the next hypothesis is presented as follows:

H2. Supplier capabilities regarding service delivery are positively connected with buyer innovation performance.

Owing to the complex nature of the digital market and the ability to create value with a single actor, creating innovation performance and renewing operations with effective relationships have gained significant attention from online store operators (Chuang and Lin, 2015; Pagani and Pardo, 2017). In e-business, absorptive capabilities, including knowledge sharing and strong relationships between business actors, can provide opportunities to transform external knowledge into innovation performance that creates new products and service offerings (Moilanen *et al.*, 2014; Raymond *et al.*, 2016). According to Najafi-Tavani *et al.* (2018), companies that are involved in collaborative networks, like those with e-businesses, can achieve innovation through the presence of absorptive capability. They also mentioned that companies with managers who know how to scan and acquire external knowledge can accelerate the pace of innovation in their companies. Active participation and interaction with buyers affect the creation and development of more complex and novel innovations (Chen *et al.*, 2011). Moreover, active participation and interaction between both suppliers and buyers enable strong buyer-supplier relationships, leading to effective collaboration built on user experiences and the information gathered on buyers' needs (Chuang and Lin, 2015; Saunila *et al.*, 2019b). According to Santamaría *et al.* (2012), effective relationships with external resources could be beneficial for growth in terms of the innovation performance of companies.

Digitalization changes the way business is conducted between firms, which causes a greater refocusing on the importance of relationships between firms, especially in B2B relationships among buyers and suppliers. For instance, B2B digital business enables Coca-Cola Enterprises to continuously monitor its customers and track its clients' preferences, leading to innovation creation through establishing efficient relationships (Niu *et al.*, 2020; Pagani and Pardo, 2017). According to Iansiti and Lakhani (2014), in e-business, relationships among firms within the process, product and service domains create a complex and dynamic environment for innovation and business development. Thus, suppliers' capabilities with regard to obtaining continued, strong relationships between their buyers can significantly contribute to buyer innovation performance. Therefore, based on the preceding discussion, the following hypothesis is formed:

H3. Supplier capabilities regarding buyer-supplier relationships are positively connected with buyer innovation performance.

3.2 Buyer operations as a moderator

Firms' innovations increasingly rely on digital technologies to handle inter-firm processes (Zhu *et al.*, 2015) or to generate value for existing or prospective customers (Chuang and Lin, 2015). However, a number of companies fail to achieve the advantages of such technology changes as a consequence of a shortage in efficient e-business process design capabilities, operational capabilities and cooperation capabilities (Chuang and Lin, 2015; Zhu *et al.*, 2015). In this study, these capabilities refer to supplier capabilities related to the product, service delivery and the buyer-supplier relationship. As presented in the preceding hypotheses, these capabilities may affect buyer innovation performance.

Operations capabilities can be understood as buyer operations used for satisfying customer needs via an online store. Buyer operations, thus refer to a company's capability to solve customers' issues electronically, which is also called e-service recovery or responsiveness (Agag, 2019; Oliveira and Roth, 2012b). Communication in terms of the informal and formal distribution of revealing and topical information (e.g. on order handling) and adjusting expectations are also buyer operations that impact the success of an online store (Agag, 2019; Oliveira and Roth, 2012b). Other buyer operations that affect the success of online stores are order fulfillment (Agag, 2019; Parasuraman *et al.*, 2005; Rabinovich, 2007); the flexibility of payment methods, returns processing and customer support (Boyer *et al.*, 2002; Saunila *et al.*, 2019b); the security of customer information (Agag, 2019; Rabinovich, 2007; Zeithaml *et al.*, 2002); and e-customization in terms of the personalization and malleability of the online experience (Oliveira and Roth, 2012b; Zeithaml *et al.*, 2002). These buyer operations can be considered internal drivers, that is, proficiencies and processes that need to be managed to authorize firm innovation (Chuang and Lin, 2015; Romijn and Albaladejo, 2002; Schmiedeberg, 2008). Buyer operations are, thus considered in this research as intrinsic drivers that empower firms to comprehend their customers and respond to their needs (cf. Chuang and Lin, 2015). Further, buyer operations reduce conflict between business partners and improve connectedness through effective contact, responsiveness and flexibility and through caring about security and customization and thereby provide quick adaptation and innovative processes, which are critical for the success of e-business (Scuotto *et al.*, 2017). This understanding, together with the supplier's capabilities, is likely to influence buyer innovation performance.

Further, digital service and product suppliers are required to have experience concerning the buyer's change process, as well as the ability to explore new opportunities to achieve a successful outcome (Saunila *et al.*, 2019a). When supplying this type of digital service, such

as an online store, the buyer's readiness to enable the supplier entry to different systems and platforms and to provide relevant information connected to the service product are essential for the prosperity of production, as the buyer is not part of the factual generation of a service (Saunila *et al.*, 2017). Based on these considerations, it can be proposed that the actions the buyer takes into account when operating the online store (forming buyer operations) are interconnected with the relationship between capabilities related to supplier and buyer innovation performance. Thus, the fourth hypothesis is formed as follows:

H4. Buyer operations moderate the connection between supplier capabilities and buyer innovation performance.

H4a. Buyer operations moderate the connection between supplier capabilities regarding the product and buyer innovation performance.

H4b. Buyer operations moderate the connection between supplier capabilities regarding service delivery and buyer innovation performance.

H4c. Buyer operations moderate the connection between supplier capabilities regarding buyer-supplier relationships and buyer innovation performance.

4. Research methodology

4.1 Sample and data gathering

This study aims to understand how buyer companies (companies that purchased an online store) leverage the potential of supplier capabilities to attain innovation performance. To achieve this aim, data were collected with cross-sectional, random sampling from companies located in Finland. A survey was used to collect data on managerial assessments of the capabilities of a supplier, the operations of buyers and the innovation performance of buyers. The focal company (also called the buyer company) in this study is an online store operator. Thus, the survey was sent to companies that had purchased an online store. The buyer companies were asked to respond to items related to the supplier services provided in terms of the online store, their own operations connected to the online store and their innovation performance. The survey was sent to individuals in managerial positions with the background and work experience necessary to respond to a survey that investigated their supplier's capabilities, on the one hand, and their own operations relating to their online stores, on the other.

From an initial sample of 2,312 online store operators (approximately 31% of the total population), we received 109 responses. Most online stores (about 75%) were really small with five employees or less and the rest (about 25%) had more than five employees. Approximately 49% of the online stores had been in operation for 5 years or less and the remaining online shops were more mature (more than five years in operation). The online stores studied operate in a variety of markets as they sell, for example, fashion apparel, sports equipment, household goods, building material software and consulting services.

We used *t*-tests to check the non-response bias. As late-wave respondents can be used to represent non-respondents (Armstrong and Overton, 1977), the data were split into the following three entities: early-wave respondents, middle-wave respondents and late-wave respondents. From these data, 47 usable responses were obtained from the early wave and 24 were obtained from the late wave. The distinctions between the early wave and the late wave when considering the means of the study variables (capabilities of the supplier, operations of a buyer and the innovation performance of a buyer) were tested using *t*-tests.

As there were no remarkable distinctions (at the 0.05 significance level), there is no bias regarding non-respondents.

4.2 Construct operationalization

All scales were based on previous measures and amended for this survey through a pretest performed by researchers familiar with the subject. The complete items are presented in the appendix. The independent variable, supplier capabilities, consisted of the following three dimensions: capabilities related to the product, capabilities related to service delivery and capabilities related to the buyer-supplier relationship. The product capabilities dimension considers elements that are necessary for the product (i.e. an online store in this study) to function properly. Thus, 15 items were selected based on the previously used scales of Gotzamani and Tzavlopoulos (2009), Huang *et al.* (2015), Oliveira and Roth (2012b) and Zeithaml *et al.* (2002). The items dealt with the usability, functionalities, security and system availability of the online store that the buyer company had purchased.

In the service delivery capabilities construct, the service process assets required with regard to the supplier were assessed. The measures for this construct included 12 items inspired by Gotzamani and Tzavlopoulos (2009), Huang *et al.* (2015), Oliveira and Roth (2012b) and Zeithaml *et al.* (2002). These works were used as a reference to assess the aspects related to information richness, responsiveness, promise fulfillment and the customization of the service process of purchasing the online store.

The buyer-supplier relationship capabilities consider the elements required to form a long-lasting relationship between the supplier of the online store and the operator of an online store (i.e. the buyer company). This construct relies on the scales of Oliveira and Roth (2012b), Gotzamani and Tzavlopoulos (2009) and Parasuraman *et al.* (2005). It consists of six items that consider the two-way buyer-supplier relationship in relation to cooperation, trust development and responsiveness.

For the moderator construct, buyer operations, we focus on the actions that the online store operator performs to serve its customers. The works of Oliveira and Roth (2012b), Zeithaml *et al.* (2002) and Parasuraman *et al.* (2005) were used to form a typology that considers contact, responsiveness, flexibility, security and customization as important features for the buyer company to contemplate when operating its online store. We assessed each item of the independent and moderating variables using a five-point Likert-type scale that varied from strongly disagree (1) to strongly agree (5).

The dependent variable, innovation performance, was measured with a scale ranging from weak (1) to excellent (4). The respondents were asked to assess their company's capability to renew its e-business operation.

Control variables included firm age (number of years the online store had been in operation) and firm size (number of employees). Well-established online stores have experience in terms of how to renew and survive in markets, and such online stores are also presumably larger and older. Thus, it was necessary to control innovation performance in relation to these issues.

Multiple remedies were adopted to avoid common method variance. Although it was not possible to attain survey responses from distinct sources, we instead separated the measures of independent and dependent variables. In addition, distinct response formats were used to avoid common method bias. We also introduced a delay between measuring the independent and dependent variables. In the cover letter, we also made the respondents aware that their survey answers would remain anonymous to reduce the possibility of garnering only socially desirable responses. Another way of checking common method variance is using Harman's one-factor procedure (Podsakoff *et al.*, 2003). Based on factor

analysis, a multiple-factor solution emerged and the percentage of variance explained by the main factor was below 50%. Thus, it was proven that common method variance is not a problem with regard to the data.

4.3 Data analysis, validity and reliability

We evaluated the validity and reliability before we tested the hypotheses. The reliability of the scales was tested using Cronbach's α, and the results suggested that all the measures have adequate levels of reliability (Hair *et al.*, 1998). The discriminant validity of the factor structure was tested by using principal component analysis with varimax rotation. This analysis eliminated items that simultaneously presented high loadings in multiple factors. Table 1 also shows that the individual items have strong loadings for their particular factors. The constructs have been proved to be distinct from one another, as the highest correlation is 0.532. The constructs and their correlations are given in Table 2. This exploratory analysis revealed the unidimensionality of the subdimensions of the capabilities of suppliers and buyer operations scales. These procedures validate the data in terms of discriminant validity.

5. Results

Multiple regression analyzes were conducted to test the hypotheses. Table 3 presents the results of the regression analyzes for buyer innovation performance, which includes three models. Model 1 was applied to test the direct impact of the number of employees and the age of the online store on buyer innovation performance. As shown in Table 3, the impacts of contextual characteristics, meaning the size and age of the online store operators, on buyer innovation performance were controlled. The results reveal that there is no significant effect between the control variables and buyer innovation performance. Model 2 was applied to test *H1–H3*, which includes the direct impact of supplier capabilities (i.e. product related, service delivery related and buyer-supplier relationship-related) on buyer innovation

Table 1.
Results of the validity and reliability tests

Constructs	*No. of items*	*Factor loadings*	*Cronbach's α*
Supplier capabilities			
Product	15	0.527–0.702	0.850
Service delivery	12	0.544–0.844	0.916
Buyer-supplier relationship	6	0.595–0.829	0.812
Buyer operations	14	0.493–0.787	0.850
Buyer innovation performance	1		

Table 2.
Correlation matrix

Variables	*Mean/SD*	*1*	*2*	*3*	*4*
Supplier capabilities					
1. Product	3.88/0.569	1.000			
2. Service delivery	3.45/0.775	0.503***	1.000		
3. Buyer-supplier relationships	3.58/0.718	0.486***	0.669***	1.000	
4. Buyer operations	3.86/0.567	0.532***	0.379***	0.337***	1.000
5. Buyer innovation performance	2.82/0.810	0.388***	0.348***	0.446***	0.320***

Note: ***$p \leq 0.001$

Variables	Model 1 β	Std. error	Model 2 β	Std. error	Model 3 β	Std. error
Controls						
No. of employees	2.54E-5	0.000	−8.50E-5	0.000	−7.01E-5	0.000
Age of online store	0.310	0.173	0.168	0.162	0.220	0.161
Main effects						
Product			0.139	0.209	4.271	1.485
Service delivery			−0.001	0.153	−4.131	1.928
Buyer-supplier relationship			0.375*	0.171	0.223	1.794
Buyer operations			0.205	0.189	0.449	0.385
Interaction effects						
Product* operations					−1.093**	0.385
Service delivery* operations					1.081*	0.496
Relationship* operations					0.014	0.446
Model summary						
F	1.632		4.664***		4.339***	
R	0.193		0.521		0.593	
R^2	0.037		0.272		0.352	
Adjusted R^2	0.014		0.213		0.271	

Notes: ***$p \leq 0.001$; **$0.001 < p \leq 0.01$; *$0.01 < p \leq 0.05$

Table 3.
Results of regression analyze for buyer innovation performance

performance. As shown previously in Table 2, capabilities related to the buyer-supplier relationship (i.e. one of the capabilities of suppliers) are positively connected with the innovation performance of the buyer ($\beta = 0.375$; $0.01 < p \leq 0.05$). Capabilities related to the product and capabilities related to service delivery (i.e. the other two capabilities) do not significantly influence the innovation performance of the buyer ($\beta = 0.139$; $p > 0.05$ and $\beta = -0.001$; $p > 0.05$, respectively). This means that concerning *H1–H3*, only *H3* was supported. Thus, the results show that the supplier's buyer-supplier relationship capabilities affect buyer innovation performance. Model 3 was applied to test *H4* (including *H4a, H4b* and *H4c*), which studies the interaction effects of buyer operations. As shown in Table 3, the moderating influence of buyer operations on the relationship between capabilities related to the product and the innovation performance of the buyer ($\beta = -1.093$; $0.001 < p \leq 0.01$) is negative. The moderating influence of buyer operations on the relationship between capabilities related to service delivery and the innovation performance of the buyer ($\beta = 1.081$; $0.01 < p \leq 0.05$) is positive. In contrast, no moderating influence of buyer operations on the link between the buyer-supplier relationship and buyer innovation performance ($\beta = 0.014$; $p > 0.05$) was found. Therefore, referring to *H4*, *H4a* and *H4b* were supported, but *H4c* was not supported. These results mean that buyer operations diminish the effect of the supplier's product capabilities on buyer innovation performance but foster the effect of the supplier's service delivery capabilities on buyer innovation performance.

6. Discussion

This study analyzed the connections between capabilities of suppliers, buyer operations and the innovation performance of buyers in service-based supply chains. Therefore, the research builds on prior studies on innovation generation via service-based supply chains (Sampson and Spring, 2012; Sengupta *et al.*, 2006) by taking into account two interconnected perspectives as follows: the supply of services and the production of services in the e-business context (Wang *et al.*, 2021; Zhu *et al.*, 2020). The current research offers an

interesting contribution to the service-based supply chain literature as follows: we integrated the perspectives of the supplier's capabilities and the buyer's e-business operations with organizational factors under which the supplier's capabilities are most influential. The study's main findings are discussed in the following.

First, the results reveal the relation between supplier capabilities and buyer innovation performance in the context of e-business. We investigated the capabilities of a supplier using three dimensions as follows: capabilities related to the product, capabilities related to service delivery and capabilities related to the buyer-supplier relationship. The results show that capabilities related to the buyer-supplier relationship are positively connected with the innovation performance of the buyer, but the capabilities related to the product and service delivery do not significantly influence the innovation performance of the buyer. This result is in agreement with prior e-business research, concluding that absorptive capabilities, including knowledge sharing and strong relationships between business actors, can provide opportunities to transform external knowledge into innovation performance in a way that creates new products and service offerings (Haque and Islam, 2018; Moilanen *et al.*, 2014; Raymond *et al.*, 2016). Thus, suppliers can have e-business-related information that the buyer does not have and building tight relationships with a supplier (i.e. using this specific supplier capability) enhances buyer innovation performance. Thus, the results contribute to dynamic capabilities theory by increasing our understanding about forming, renewing and reconfiguring capabilities and resources to innovate in the market environment (Teece, 2018).

Second, this study reveals the role of buyer operations in the linkage between supplier capabilities and buyer innovation performance. The results show that the moderating influence of buyer operations on the relationship between capabilities related to the product and the innovation performance of the buyer is negative. The moderating influence of buyer operations on the relationship between capabilities related to service delivery and the innovation performance of the buyer is positive. The negative moderation is somewhat surprising as previous research showed that supplier information regarding the product can help buyers renew and update their online stores properly and boost buyer innovation performance (cf. Zhu *et al.*, 2015). As suppliers develop and provide online stores for different buyers and for different purposes, they gather specialized knowledge related to online store functionalities that buyers do not have. Thus, buyer participation in the online store production process is rarely needed; in fact, participation can become a problem as buyers without the necessary expertise and knowledge can create a negative effect. On the other hand, buyer operations were found to foster the relationship between the supplier's service delivery capabilities and buyer innovation performance, which may be due to the buyers having different needs and requiring different service delivery. The needs of the buyer must be heard to renew buyer operations. Recognizing each buyer's knowledge of its customers together with the service delivery process enhances buyer innovation performance. Previous research touched on this by concluding that when supplying this type of digital service (i.e. an online store), the buyer's readiness to allow the supplier access to different systems and platforms and to provide relevant information connected to the service product is essential for the prosperity of production, as the buyer is not part of the factual generation of a service (Saunila *et al.*, 2017).

Third, no moderating influence of buyer operations was found on the relationship between capabilities related to the buyer-supplier relationship and the innovation performance of the buyer, which might be because a good buyer-supplier relationship improves buyer innovation performance regardless. The buyer's own operations and

actions regarding its end customers do not cause much of an effect because renewal originates so strongly from the supplier relationship.

7. Conclusions

7.1 Contribution to the theory

The study contributes to supply and operations management literature by examining the connection between supplier capabilities, buyer operations and the innovation performance of buyers in e-business. The study concludes that capabilities related to the buyer-supplier relationship are positively connected with the innovation performance of a buyer with regard to e-business. Contrary to this, the capabilities related to the product and service delivery do not significantly influence the innovation performance of the buyer in relation to e-business. The study also highlights the positive moderating influence of buyer operations on the relationship between capabilities related to service delivery and the innovation performance of the buyer. In contrast, the moderating influence of buyer operations on the relationship between capabilities related to the product and the innovation performance of the buyer is negative.

7.2 Contribution to managerial practice

This study provides instructions to managers on how an online store operator (the buyer) can leverage its supplier's capabilities to gain business value regarding innovation performance. Forming tight relationships with online store suppliers appears to be a successful way to attain innovation performance for online store operators. On the other hand, online store operators should not expect supplier capabilities related to online store functionality and characteristics of online store delivery alone to improve their innovation performance. Knowing that buyer operations embrace a moderating role in the connection between the supplier's capabilities in terms of product and service delivery, managers should take this into account when operating with their suppliers with the goal of improving innovation performance. Through their own operations related to their online stores, online store operators can benefit from their suppliers' service delivery capabilities and improve their innovation performance. However, online store operators should be careful in terms of putting too much weight on these operations as they can also have a hampering effect, for example, when the supplier has specific expertise related to the functionalities and technical execution of the online store. In this case, the actions the buyer takes when operating the online store can diminish the effect of the supplier's capabilities on buyer innovation performance.

7.3 Limitations and future scope of the research

First, because the study builds on data from one country, the demography needs to be considered when generalizing the results. Second, the dependent variable was innovation performance and effects on other types of performance need further research. Third, the study was conducted among online store operators and the applicability of the results should be studied in other contexts as well. Finally, due to the cross-sectionality of the research, longitudinal studies may offer valuable insight into the interplay between supplier capabilities and buyer operations. For example, trust's role in the relation between a supplier and an online store operator requires further research. It would be useful to examine what is required to build trust in the e-business context, as it differs from that between a goods supplier and an online store operator.

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