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Exploring Central Platform Types and Related Concepts in Service Research – A Systematic Literature Review

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Exploring Platform Types and Related Concepts in Service Research – A Systematic Scoping Literature Review

Research Paper

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Abstract. Service exchange is considered as an integral component of digital platforms. Academic research differentiates between technical, economic, and social platforms, yet scholars face a multitude of diverse platform sub-types being inconsistently utilized. To address that issue and to provide a lexical platform definition overview, this study conducts a systematic scoping literature review on platform types and related concepts in the service domain. The systematic analysis of 49 high-quality service journal articles reveals that numerous digital platform sub-types exist in service research with overlapping definitions. Moreover, several relationship marketing constructs are investigated as central related concepts. This article is the first to explore divergent platform term definitions in the service domain and thus contributes a complementary service science lens on digital platforms alongside IS research.

Keywords: Digital Platform, Platform Types, Service Lens, Literature Review

1 Introduction

Digital platforms frequently enable service provision and consumption. With a globally rising availability of smart devices (Ostrom et al. 2015), a broad spectrum of citizens is continuously accessing cyber-physical ecosystems on a daily basis (Wortmann and Flüchter 2015; Zhang et al. 2012). In these digital ecosystems appear several platform types predominantly building on service exchange (Bartelheimer et al. 2022; Taylor 2018). For instance, not only the message delivery process through social media platforms is a frequently consumed service, but also booking flexible ridesharing services by means of commercial platforms has become omnipresent (Cachon et al. 2017). Thus, digital platforms are deeply embedded in service contexts (Bartelheimer et al. 2022). Apart from these ordinary examples exist several other platform types within service contexts. Whereas established literature predominantly considers digital platforms from technical (de Reuver et al. 2018), economic (Cennamo and Santalo 2013), and social (Perren and Konzinets 2018) perspectives, this rather broad segmentation contains a heterogenous pool of platform sub-types (Bartelheimer et al. 2022). Due to definition

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inconsistencies of the platform sub-types in service research such as mobile, multi-sided, or service platforms (Hagiu and Wright 2015; Lusch and Nambisan 2015; Manner et al. 2013), it remains unclear what platform types and related concepts take on central relevance in service research. This ambiguity concerns not only scholars but also practitioners seeking suitable platforms for customer interactions. Therefore, research is urgently required to respond to that issue. *RQ: which digital platform types and related concepts are distinguished in service research?*

To address the proposed research question, this study is the first to conduct a systematic, scoping literature review on digital platforms in the service sector. It thus contributes to service science by providing a platform definition overview and highlighting research streams and gaps through a service lens. Beyond that, this contribution adds a foundation for subsequent research may targeting the harmonization of platform definitions. Moreover, the results can serve practitioners to better understand digital platforms and to discover the platform type most suited to engage with their customers. The following sections provide insights into the state of research, method, results, and discussion. Finally, conclusions, limitations, and future research avenues are outlined.

2 Background

Since 2010, scientific interest in digital platforms has considerably risen, leading to a broad range of platform types and related concepts being regularly, but without critical distinction, utilized in research and practice. Digital platforms are "a mediating entity operating in two- or multi-sided markets, which uses the internet to enable direct interactions between two or more distinct but interdependent groups of users to generate value" (Beverungen et al. 2020, p. 513). In this respect, contemporary platform research examines a variety of platform types and related concepts which can be understood from technological, economic, or social perspectives (Bartelheimer et al. 2022).

Starting with the first perspective, Tian et al. (2019, p. 1) define a technological platform as "an extensible technological foundation which allows complement providers to interact with users." In contrast, another study (Gawer 2014) regards technological platforms not solely from the purely technical standpoint. Instead, Gawer (2014, p. 1240) also takes economic elements into account: "(1) federate and coordinate constitutive agents who can innovate and compete; (2) create value by generating and harnessing economies of scope in supply or/ and in demand; and (3) entail a modular technological infrastructure composed of a core and periphery." By this stage, a first example of how platform type definitions can deviate becomes visible.

The second perspective encompasses economic platform types, being all manifested by "the exchange of concrete economic resources in a quid pro quo fashion" between the present platform partners (Loi et al. 2009, p. 403). For instance, there are e-commerce, service, and peer-to-peer platforms. Relying on Huang et al. (2011, pp. 2171-72), an "e-commerce platform provides users with a variety of business component […] to complete the online transaction process […] with a series of support services." Apart from e-commerce platforms, scholars show interest in service platforms. Service platforms are "value proposition(s) consisting of a modular structure that invites to and

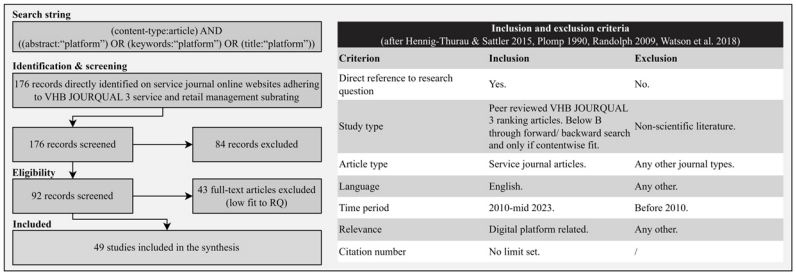
facilitates value co-creation […] in a continuous service process" (Löfberg and Åkesson 2018, p. 768). Lastly, in the context of peer-to-peer sharing platforms, Wirtz et al. (2019, p. 458) define these as "two- or more-sided […] platforms through which people collaboratively provide and consume capacity-constrained assets and resources."

Switching to the last perspective, social platforms – recognized as "an environment that provides social entities and interactivity […] through digital applications" (Mitchell-Wong et al. 2008, p. 361) – are a major part of platform research. Interestingly, this social platform definition by Mitchell-Wong et al. (2008) is strongly overlapping with Kaplan and Haenlein's (2010, p. 60) definition of social media platforms as they define this platform type as "a platform to facilitate information exchange between users." Finally, another social media platform definition overlaps with the previous platform definitions: "website, or varying interfaces and software combinations through which user-generated content, interaction […] are communicated" (Wade et al. 2020, p. 1306).

Taken together, this state of research indicates how inconsistent literature on several platform definitions, being linked to diverse related concepts, deviates from each other.

3 Research Method

Responding to both the gap and research question, this article draws on the method of a systematic literature review. Systematic literature reviews aim to generate comprehensive insights into a particular discipline by systematically summarizing and reviewing established wisdom (Brandhorst 1982; Hulland and Houston 2020). For this purpose, a scoping review approach – critically analyzing and evaluating studies in terms of topics and contents – after Paré et al. (2015) is applied. Concretely, Levy and Ellis's (2006) input-processing-output model is utilized. This literature review includes highly ranked, service-oriented journal articles, adhering to the VHB JOURQUAL 3 ranking system (Hennig-Thurau and Sattler 2015, Plomp 1990) within the time period from 2010 to mid 2023 as the number of platform-related articles in academic literature has been continuously increasing since then (Bartelheimer et al. 2022). Furthermore, figure 1 informs about the search procedures after Moher et al. (2009) and inclusion criteria.



Inclusion and exclusion criteria
(after Hennig-Thurau & Sattler 2015, Plomp 1990, Randolph 2009, Watson et al. 2018)

Criterion	Inclusion	Exclusion
Direct reference to research question	Yes.	No.
Study type	Peer reviewed VHB JOURQUAL 3 ranking articles. Below B through forward/ backward search and only if contentwise fit.	Non-scientific literature.
Article type	Service journal articles.	Any other journal types.
Language	English.	Any other.
Time period	2010-mid 2023.	Before 2010.
Relevance	Digital platform related.	Any other.
Citation number	No limit set.	/

Figure 1. Search strategies and procedures

After the identification of 49 articles in total, all platform types, related concepts, and their definitions are gathered and added if missing. To create the classification scheme,

a qualitative content analysis (Mayring 2000) of the platform type and related concept definitions is performed to find contentwise and thematic overlaps (see chapter 4.1). As in the case of the discovered platform types, no suitable concepts for a deductive classification exist; explorative-inductive procedures, respectively, the category formation are required (Mayring 2000). In contrast, the related concepts are assigned to deductive categories by matching them with established literature (Mayring 2000). In alignment with the platform type and related concept definitions, coding rules are defined (Mayring 2000) to aggregate the mentioned platform types and related concepts into seven categories. In terms of the classification scheme development, every platform type and related concept being contentwise core element of the study, is considered. Quality criteria after Hulland and Houston (2020) are ensured while adhering to the VHB JOURQUAL 3 service and retail management subrating (Hennig-Thurau and Sattler 2015).

4 Results

4.1 Organizational Framework for Classification of Research Contributions

After the classification, there are seven superordinate categories: three platform type-specific and four related concept-specific categories. The first category – general internet of things (IoT) platform (types) – is defined as "the middleware and the infrastructure that enables the end-users to interact with smart objects" (Mineraud et al. 2016, p. 5). All platform types being assigned to this category predominantly share technological functions of connecting platform parties. In contrast, the second category, labeled entertainment platforms, contains platform types that aim to enhance "enjoyment of life by offering interactive play-based multimedia applications which precisely target social needs" (Senger et al. 2012, p. 704). Then, the economic exchange platforms category merges platforms that rely on exchanging economic goods (Loi et al. 2009). Shedding light on the four related concept-specific categories, the category named customer-focused relational concepts covers popular relationship marketing constructs (Palmatier et al. 2006). However, the classification of the final three categories follows Beverungen et al.'s (2020) theory identifying the platform participant roles of customer, seller, and (infrastructure) provider. Accordingly, the customer-seller platform interactions category incorporates concepts requiring direct interaction between customers and sellers (Beverungen et al. 2020). Conversely, the seller-specific platform interactions category only implies concepts with active seller activity (Beverungen et al. 2020). Ultimately, the platform provider infrastructure antecedents category focuses on platform provider-specific concepts to enable participants' interactions (Beverungen et al. 2020).

4.2 Results of Literature Search Process and Classification of Articles

Next, the relevant N=49 articles are mapped according to the proposed organizational framework (tables 1 and 2). After that, the discussion outlines the listed contributions and platform types sorted by the four identified related concept categories.

Table 1. Platform types in service research (inductive classification)

Authors	General IoT Platform (Types)				Entertainment Platforms			Economic Exchange Platforms										
	Digital platform	Mobile platform	Online platform	Platform (unspecified)	Live-streaming platform	On-demand platform	Social media platform	Bot-driven platform	Engagement platform	E-commerce platform	Multi-sided platform	Networking platform	Online shopping platform	Peer-to-peer platform	Review platform	Ridesharing/ridehailing platform	Service platform	(Two-/Sided platform
Algharabat et al. (2018)							X											
Algharabat et al. (2020)							X											
Andreassen et al. (2018)										X								
Bai et al. (2019)						X												
Ballantyne and Nilsson (2017)							X											
Baum et al. (2018)							X					X						
Benoit et al. (2016)			X				X											
Bernstein et al. (2020)																		X
Cachon et al. (2017)														X			X	
Cao et al. (2013)																	X	
Carlson et al. (2018)							X		X									
Chen et al. (2018)			X															
Cho and Menor (2010)			X															
Ciuchita et al. (2022)	X																	
Fehrer et al. (2018)											X							
Filieri et al. (2022)							X											
Giertz et al. (2022)					X													
Gong et al. (2023)																X		
Griffith et al. (2018)			X															
Guillemot and Privat (2019)			X															
Guyader (2018)			X											X				X
Ha et al. (2022)			X															
Harwood and Garry (2015)							X		X									
Hazée et al. (2020)	X																	
He et al. (2023)			X															
Heinonen and Medberg (2018)			X															
Hogreve et al. (2019)			X				X											
Hollebeek et al. (2020)				X														
Klaus and Zaichkowsky (2020)								X									X	
Konzinets (2022)																	X	
Lee et al. (2018)													X					X
Li et al. (2023)										X								
Lin et al. (2019)			X				X							X				
Liu et al. (2023)																	X	
Markfort et al. (2022)				X														
Martínez-de-Albéniz et al. (2022)																		X
Mathwick and Mosteller (2017)															X			
Mody et al. (2020)												X						
Munzel and Kunz (2014)			X												X			
Rios et al. (2022)			X															
Siddiq and Taylor (2022)																X		
Smedlund (2012)																	X	
Taylor (2018)						X												
Thakur (2018)		X									X							
Uhrich et al. (2023)			X															
Wang et al. (2015)		X																
Warren and Hanson (2023)																	X	
Wei et al. (2018)							X		X									
Wirtz et al. (2019)														X				
∑	2	2	14	2	1	2	11	1	3	2	2	2	1	4	2	2	7	4

Table 2. Platform-related concepts in service research (deductive classification)

Authors	Customer-Focused Relational Concepts								Customer-Seller Platform Interactions							Seller-Specific Platform Actions		Platform Provider Infrastructure Antecedents					
	Customer lifecycle	Customer Partici-pation	Customer experi-ence	Affectivity	E-WOM	Loyalty	Satisfaction	Trust	AI-bot	Pricing	Retailing	Reviewing	Sharing	Social withdrawal	Value co-creation	Service manage-ment	Service quality	Digital services-cape	Multi-sided mar-ketplaces	Network effects	Peer-to-peer mar-kets	Platform business model	Service ecosystem
Algharabat et al. (2018)		X			X																		
Algharabat et al. (2020)		X				X																	
Andreassen et al. (2018)						X													X				
Bai et al. (2019)										X													
Ballantyne and Nilsson (2017)															X			X					X
Baum et al. (2018)					X						X												
Benoit et al. (2016)		X													X								
Bernstein et al. (2020)													X										
Cachon et al. (2017)										X			X								X		
Cao et al. (2013)						X														X			
Carlson et al. (2018)	X	X													X								
Chen et al. (2018)		X																		X			
Cho and Menor (2010)																	X						
Ciuchita et al. (2022)					X																		
Fehrer et al. (2018)															X						X	X	
Filieri et al. (2022)				X																			
Giertz et al. (2022)		X																					
Gong et al. (2023)													X										
Griffith et al. (2018)				X	X		X																
Guillemot and Privat (2019)															X								
Guyader (2018)													X								X		
Ha et al. (2022)											X												
Harwood and Garry (2015)		X																					
Hazée et al. (2020)													X										
He et al. (2023)																						X	
Heinonen and Medberg (2018)					X										X								
Hogreve et al. (2019)	X				X											X							
Hollebeek et al. (2020)		X																					
Klaus and Zaichkowsky (2020)			X						X														
Konzinets (2022)		X																					
Lee et al. (2018)																						X	
Li et al. (2023)								X															
Lin et al. (2019)		X																			X		
Liu et al . (2023)										X							X						
Markfort et al. (2022)																						X	
Martínez-de-Albéniz et al. (2022)										X													
Mathwick and Mosteller (2017)		X																					
Mody et al. (2020)																					X	X	
Munzel and Kunz (2014)					X							X											
Rios et al. (2022)													X										
Siddiq and Taylor (2022)													X										
Smedlund (2012)															X							X	
Taylor (2018)		X								X													
Thakur (2018)		X					X	X				X											
Uhrich et al. (2023)															X								
Wang et al. (2015)	X																						
Warren and Hanson (2023)										X													
Wei et al. (2018)														X									
Wirtz et al. (2019)								X					X							X			
Σ	3	13	1	2	7	3	2	3	1	6	2	2	8	1	8	1	2	1	1	3	5	6	1

5 Discussion

5.1 Contributions to Customer-Focused Relational Concepts Category

The first category and research stream labeled customer-focused relational concepts covers contributions investigating popular relationship marketing constructs (Palmatier et al. 2006) in the context of digital platforms to varying degrees.

As first insight, service research in the context of platforms and customer-focused relational concepts predominantly targets the topic of *customer participation (commitment, engagement, and involvement)*, being defined as "customer behaviors (that) go beyond transactions and may be specifically defined as a customer's behavioral manifestations that have a brand or firm focus, (even) beyond purchase" (van Doorn et al. 2010, p. 254). For instance, Benoit et al. (2016) regard member's ability, role clarity, and enjoyment as antecedents determining consumer participation on online and social media platforms. Thereby, an online platform, being the most researched platform type of the general IoT platform category, is defined as "a digital service that facilitates interactions between two or more distinct but interdependent sets of users (whether firms or individuals) who interact through service via the Internet" (OECD 2019, p. 20). Contrary to that, Harwood and Garry (2015) assume gamification positively affects customer enjoyment leading to increased engagement, trust, and loyalty on engagement and social media platforms. In this regard, engagement platforms (as part of the economic exchange platforms) are "physical or virtual touchpoints designed to provide structural support for exchange and integration of resources, and thereby co-creation of value between actors in a service ecosystem" (Breidbach et al. 2014, p. 596). Lastly, new service research topics cover algorithmic branding to increase consumer engagement (Konzinets 2022) and commitment in the context of live-streaming platforms (Giertz et al. 2022). Here, a live-streaming platform is known as "an environment for novel engagement behaviors and monetization structures" (Giertz et al. 2022, p. 33).

However, the two concepts of *e-WOM* – positive or negative customer (online) statements about company assets (Hennig-Thurau et al. 2004) – and customer *loyalty* – consistent consumer commitment or repetitive repurchases of preferred same-brand goods (Oliver 1997) – are frequently inspected too. Examples include two investigations by Algharabat et al. (2018, 2020) observing significant influences of consumer involvement, customer brand engagement, and participation on *e-WOM* and client *loyalty* on social media platforms. Interestingly, the term social media platform, known as "a platform to facilitate information exchange between users" (Kaplan and Haenlein 2010, p. 60), is widely examined in the entertainment platforms category. Drawing on the oftenmentioned concept of *customer lifecycle (behavioral intentions, adoption, usage, and repurchase)*, Hogreve et al. (2019) observe broad service recovery transparency to enhance *e-WOM* and purchase intentions, once again, on social media platforms. Recently, research on *e-WOM* lives up again by using netnography (Heinonen and Medberg 2018) and elaborating an user-created communication affordances framework for digital platforms (Ciuchita et al. 2022). So, service research often explores *e-WOM.*

Turning to the less researched themes in the customer-focused relational concepts category, customer *satisfaction, trust,* and *affectivity* during the *customer experience* play a major role. *Satisfaction* as affective customer response to consumed company assets (Giese and Cote 2000) and *trust* as client's overall perception of the provider's honesty, ability, and willingness to help (Keh and Xie 2009), highly depending on the degree of information asymmetry between the interacting parties (Li et al. 2023), receive attention in Thakur's (2018) study. Thakur's (2018) findings indicate brand engagement to positively mediate the effect of customer *satisfaction* and retailer *trust* on online review intentions within mobile and multi-sided platforms (general IoT platforms and economic exchange platforms categories). With regard to these platform types, Manner et al. (2013, p. 1375) claim "mobile platforms to enable third parties to extend and enhance functionalities of products and services by mediating these to consumers." Alongside the rather technical definition of mobile platforms (Manner et al. 2013), a multi-sided platform "enables direct interaction between two or more distinct sided (while) each side is affiliated with the platform" (Hagiu and Wright 2015, p. 5). Comparing mobile and multi-sided platforms (Hagiu and Wright 2015, Manner et al. 2013), a distinction gets blurry as both platform definitions entail enabling interactions.

Lastly, the concept of actor *affectivity* (*emotions, emotional bonding, and attachment)* during the *customer experience* is likely to be under-researched as there are only two studies on that topic in the specific contexts of ridesharing (Griffith et al. 2018) and robot encounters (Filieri et al. 2022). In line with that, it remains fundamentally unclear how *customer experience* in virtual environments and especially on digital platforms, can be conceptualized. Moreover, research is confronted with the unanswered question which emotions and emotional triggers occur at distinct touchpoints during the whole customer journey in virtual spheres. To sum up, the first research stream compromises established customer relational concepts (Palmatier et al. 2006) on the popular digital platform types, such as online and social media platforms, but lacks knowledge regarding mobile platforms and related concepts like *customer experience* and emotions.

5.2 Contributions to Customer-Seller Platform Interactions Category

Moving to the next category (customer-seller platform interactions), this research stream sheds light on direct customer-seller interactions (Beverungen et al. 2020). To begin, the data illustrates that *pricing, sharing, and value co-creation* are immensely investigated, while the topics of *artificial intelligence robot (AI-bot), retailing, reviewing, and social withdrawal* are rarely linked to platforms in service research.

Service literature concerning the widely explored related concept of *pricing* being a joint decision-making process about the value of goods (Arsanjani 1977) encompasses on-demand, two-sided, and service platforms. For example, Bai et al. (2019) and Martínez-de-Albéniz et al. (2022) theoretically study the challenge of selecting optimal (dynamic) prices to maximize platform profits under conditions like perishable, seasonal goods, time- and price-sensitive customers on on-demand and sided platforms. Here, the rather little inspected on-demand platform (in the entertainment platforms category) is specified as "platform that connects waiting-time-sensitive customers with independent service providers" (Taylor 2018, p. 704). Nevertheless, wisdom is lacking in cases

of declining demand or growing competition. This gap is addressed by Bernstein et al. (2020), describing that even in case of enhanced competition on a two-sided platform (entity of economic exchange platforms category) like Uber or Lyft, prices increase with growing demand in the sharing economy. In contrary, other contexts, such as healthcare, show that greater competition can result in lower prices and higher service quality (Liu et al. 2023). Besides the traditional *pricing*, digital tipping on service and sided platforms currently receives greater attention (Warren and Hanson 2023). In this respect, a two-sided platform is "one in which 1) two sets of agents interact through a […] platform, and 2) the decisions of each set of agents affect the outcomes of the other(s)" (Rysman 2009, p. 125). Interestingly, Cachon et al. (2017) label Uber and Lyft in the sharing context as a service instead of two-sided platform. While surprising at first glance, this case indicates how businesses can unite elements of more than one platform type. Also, the definitions reveal the closeness of both platforms as Lusch and Nambisan (2015, p. 162) define a service platform as "a modular structure that […] facilitates the interaction of actors and resources" (Lusch and Nambisan 2015, p. 162).

Recapturing the *sharing* concept, Guyader (2018) and Belk (2014) affirm that *sharing* economy practices, including ridesharing on online platforms, cannot be classified as true *sharing* because these practices are market-mediated and rather refer to the idea of renting (pseudo-*sharing*). Moreover, ridesharing is investigated concerning vehicle purchase decisions (Gong et al. 2023) and potential competition by autonomous driving vehicles (Siddiq and Taylor 2022) on ridesharing/ ridehailing platforms. These economic platforms "match drivers and riders to trips, using dynamic prices to balance supply and demand" (Ma et al. 2020, p. 53). In this respect, service research investigates not only functional and psychological barriers to neglecting *sharing* (Hazée et al. 2020) but also the subject of matching on online dating platforms (Rios et al. 2023) too.

The final intensely debated issue in the customer-seller platform interactions stream is the concept of *value co-creation*. Generally, *value co-creation* is characterized by a joint co-construction between customers and firms to generate mutual value (Prahalad and Ramaswamy 2004). Recently, Fehrer et al. (2018) present a conceptual approach comparing Vargo and Lusch's (2016) service-dominant logic (SDL) and the platform business model logic (PBML) value co-creation. Compared to the SDL, which is grounded on actor's resource integration and service exchange, the platform business model logic highlights the additional characteristics of non-hierarchical collaboration while the platform actors benefit from a symbiotic service exchange on a multi-sided platform (Fehrer et al. 2018). In another study, Guillemot and Privat (2019) discover co-creation and collaborative consumption on online platforms from a non-commercial perspective accentuating the importance of social values, relationship-building, mutual value, individual and collective well-being. Enlarging this notion, Uhrich et al. (2023) spot hedonic, social, symbolic, utilitarian value in customer-to-customer interactions.

Turning the attention to the less researched concepts in the customer-seller platform interactions category, *social withdrawal* (avoiding social interaction) as counterpart of actor co-creation is found on social media and engagement platforms (Wei et al. 2018). Wei et al. (2018) notice enhanced *social withdrawal* if participants receive information about other users in advance in virtual, crowded areas but also due to psychological stress. However, research does not holistically capture triggers for *social withdrawal*.

Additionally, strategic *retailing* appears to be little researched yet. To start, Ha et al. (2022) investigate choice problems regarding online retailing channels on online platforms. Apart from that field, Baum et al. (2018) quantitatively support significant influences of both product testers and the community sense on the customer's attitude toward promoted goods and purchasing intentions in the context of social media and networking platforms. Staying in this field, Klaus and Zaichkowsky (2020) investigate artificial intelligence voice robots on service and bot-driven platforms. In total, Klaus and Zaichkowsky (2020) clarify that a bot-driven platform features an *artificial intelligence robot (AI-bot)* as primary service provider to enhance convenience, offer a more effortless and less time-consuming experience by autonomously anticipating human needs. Beyond these benefits, relationship-building mechanisms between humans and *AI-bots* (as friends or life coaches) are unexplored (Klaus and Zaichkowsky 2020). Thus, researchers are encouraged to respond to the questions what roles artificial intelligence can hold in virtual environments and which central use cases are reasonable.

The last rather unresearched subject deals with customer *reviewing* motives. Indeed, there are four *reviewing* motives identified by Munzel and Kunz (2014): 1) positive experiences and supporting other consumers, 2) negative experiences and warning other consumers, 3) establishing social bonds, 4) hoping for personal benefits. These motives are linked to online and review platforms (Mathwick and Mosteller 2017). Concluding these observations, *pricing, sharing, and value co-creation* are strongly researched, whereas *social withdrawal, strategic retailing*, and *AI-bots* are not.

5.3 Contributions to Seller-Specific Platform Interactions Category

The subsequent research stream exclusively involves seller-specific platform interactions and responsibilities with the two related concepts of *service management (communication, service failure, service recovery)* and *electronic service (e-service) quality*.

Hogreve et al. (2019) consider *service management* in terms of service failure and the upcoming recovery attempts on online and social media platforms. Principally, service failures are performances not reaching customer expectations and the subsequent service recovery represents organizational reparation attempts (Hess et al. 2003).

The second relevant related concept of this category is (*e-)service quality*, known as efficiency and effectivity degree of a system facilitating retailing and delivery processes (Parasuraman et al. 2005). In the beginning, Cho and Menor (2010) conceptualize four e-service encounters for online platforms covering informational, self-directive, intervenient, and intensive service encounters. After Cho and Menor (2010) represent podcasting or file-sharing websites informational encounters, whereas user-guidance happens in self-directive encounters. Intervenient and intensive encounters share the same concepts of collaboration and joint contribution, but intensive encounters explicitly expand this idea by satisfying personal needs with customization (Cho and Menor 2010).

Overall, *service management* and (e-)*service quality* seem to be greatly researched by popular marketing studies (e.g., see Hart et al. 1990; McCollough et al. 2000; Parasuraman et al. 1994; Parasuraman et al. 2005) but due to rapidly progressing technical innovation in the last few years, *e-service quality* need an update for the contexts of mobile apps and digital platform environments.

5.4 Contributions to Platform Provider Infrastructure Antecedents Category

The last category – platform provider infrastructure antecedents – builds on the IS research stream of technology-based infrastructures and ecosystems (Barret et al. 2015).

Initiating with the strongly explored concepts, *network effects* rely on formal and informal relationship-building (Wolff and Moser 2008). Sticking to the formal *network effects*, Fehrer et al. (2018) conceptualize three business network types, including firm-centered, solution and open networks in the context of multi-sided platforms. Whereas firm-centered networks are limited to internal members, the open solution networks also allow everyone to participate for resource integration (Fehrer et al. 2018). Unlike Fehrer et al. (2018), Wirtz et al. (2019, p. 458) concentrate in their conceptual study on direct (same-side) and indirect (cross-side) *network effects* on peer-to-peer platforms. The term direct network effect is applied when the utility of a distinct service for one group (e.g., social media users) increases with more same-group users (e.g., family and friends) joining the platform (Wirtz et al. 2019). Opposed to the direct effects, the value generated by indirect *network effects* only grows if a group having other abilities (not being available before) joins (Chen et al. 2018; Wirtz et al. 2019).

Moving to another widely investigated concept, service research is highly interested in *peer-to-peer markets,* described as "a decentralized structure where all peers cooperate with what they have available" (Sousa et al. 2019, p. 3). By comparing the peer-to-peer platform (Wirtz et al. 2019) and *peer-to-peer market* (Sousa et al. 2019) definitions, it is evident that platform type and related concept overlap. Since peer-to-peer engagement is little research yet (Lin et al. 2019), it seems promising for future work.

Finally, the concept of *platform business models* is missing, which draws on digital platforms to link suppliers and demanders (Appelfeller and Feldmann 2018). On this matter, Fehrer et al. (2018) differentiate between three *platform business model* properties: multi-sided platform/ market to enable interactions, platform ecosystem as technology system to run applications, and platform ecosystem as platform-based markets with network of partnerships. In contrast, Wirtz et al. (2019) take a different perspective detecting pipeline and *platform business models*. In this regard, Markfort et al. (2022) elaborate on three business model innovation patterns: skimming (aligning existing value creation practices with a new platform), revenue generation (through service improvements by platform integration), and orchestration (collaboration between several platform ecosystem partners) (Markfort et al. 2022). Parallel to that, research outlines three revenue sources of *platform business models*: pay-per-click advertising, pay-per-impression display advertising, and membership fees (Lee et al. 2018). Nonetheless, the current off-platform trend – meeting on the platform but transacting off-platform to avoid commissions – complicates the revenue generation for platforms (He et al. 2023).

However, the concepts of *multi-sided marketplaces*, *digital servicescape* and virtual *service ecosystems* have been less extensively researched. Referring to the *multi-sided marketplaces,* Andreassen et al. (2018) argue triadic business models with two or more groups resemble *multi-sided marketplaces*. Aside from that, Ballantyne and Nilsson (2017) address *digital servicescape* and virtual *service ecosystems* in the area of social media platforms. In comparison with the traditional concept (Booms and Bitner 1981), the digital servicescape has technology-mediated communication, virtual avatars and is

less tangible (Ballantyne and Nilsson 2017). Nevertheless, Ballantyne and Nilsson (2017) encourage further investigation of how the *digital servicescape* affects the *customer experience*. Besides that, research is scarce on how to conceptualize and design a *digital servicescape* in virtual environments. Simultaneously, research is invited to investigate how the term digital (service) ecosystem can be defined and conceptualized.

6 Conclusion, Limitations, and Future Research

This article contributes a systematic literature review by investigating meaningful platform types and related concepts in service research. By critical linkage and evidence-based classification of articles, three platform types and four related concept categories become apparent as key insights. In case of platform types, there are the categories general IoT platforms, entertainment platforms and economic exchange platforms, each covering a varying number of platform types. Interestingly, these platform types have been unequally investigated as online (entity of general IoT platforms) and social media platforms (part of entertainment platforms) are mostly addressed by service researchers. Similar observations concern the related concepts as customer participation (entity of the customer-focused relational concept category), value co-creation and sharing (part of customer-seller platform interaction category) and platform business model (entity of platform provider infrastructure antecedents category), which are regularly mentioned. In turn, the category of seller-specific platform interactions receives little attention. To conclude, the findings reveal a growing relevance of platforms in the service sector and allow academics as well as practitioners to distinguish several platform types from a definitional perspective. Practitioners benefit even further by facing a pool of platform types that may encompass suitable platforms to engage with their customers. Nonetheless, some platform type definitions in service research still overlap. From this, we learn that further research, including a mutually agreed collection of platform definitions (e.g., through a Delphi study and beyond service research), is needed. In fact, this literature review faces two limitations. It compromises only the VHB JOURQUAL 3 service and retail management subrating from 2015, which may need an update in certain cases after nearly a decade. And a time period from 2010 until mid 2023 may exclude platform types and related concepts from previous years. Apart from that, table 3 lists eminent research questions on identified gaps that needs urgent clarification.

Table 3. Avenues for future research

Platform definition separation	▪ How can research form an accepted understanding of platform type definitions? ▪ What are key criteria to distinguish the overlapping platform types/ definitions?
Customer-focused relational concepts	▪ How can customer experience be conceptualized in virtual environments and esp. on digital platforms? ▪ How can the customer experience be conceptualized in analog and digital spheres, including the transition phase? ▪ Which emotions occur at distinct touchpoints during the whole customer journey in virtual environments? ▪ What factors trigger emotions of platform participants in virtual contexts?
Customer-seller platform interactions	▪ Which use cases for artificial intelligence exist in virtual environments and on digital platforms? ▪ What roles can artificial intelligence hold in virtual environments? ▪ Which factors cause social withdrawal in cyber-physical environments?
Seller-specific platform interactions	▪ Which analog and digital factors affect the perceived service quality in virtual environments and esp. on digital platforms?
Platform provider infrastructure antecedents	▪ How can the servicescape be conceptualized and designed in virtual environments? ▪ How can a digital (service) ecosystem term be conceptualized and defined?

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