Managing Continuous Digital Service Innovation for Value Co-Creation

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Abstract

Service organizations across various industries are increasingly implementing continuous development methods and practices to transform their digital service innovation and development processes. Consequently, continuous digital service innovation (DSI) has become a way to react to today's dynamic markets by proposing value to customers quickly while maintaining service quality. However, little is known about how organizations can enable value co-creation (VCC) in their continuous DSI processes. We fill this gap in the literature by focusing on organizational-level continuous DSI processes. Based on findings from 23 industry informants from six Finnish digital service organizations, we present a preliminary framework depicting three integral and interdependent dimensions of managing continuous DSI for VCC within organizations: managing continuous operations, managing people, and managing resources. We argue that such management insights are crucial for both research and practice for realizing the VCC potential of continuous DSI for organizations.

Keywords: continuous digital service innovation, value co-creation, service-dominant logic, service management, qualitative research

1. Introduction

With today's rapid technological advancements and dynamic market environments, a growing number of digital service organizations are adopting continuous methods and practices to transform their service development and innovation processes into continuous ones. The resulting process, which we call continuous digital service innovation (DSI), has become crucial for organizations to remain competitive and propose relevant value to their customers quickly without sacrificing service quality.

Building on a service-dominant (S-D) logic-based understanding of service innovation (see Lusch & Nambisan, 2015, p. 161), we define continuous DSI as

the *continuous rebundling of diverse resources to create novel resources that are beneficial to actors in a digital service context*. This description includes several important characteristics. First, we define continuity in service innovation as a systematic and continuous activity in organizations aimed at perceived short- and long-term benefits (for individuals and organizations) as well as the continuous development of capabilities to enable this (i.e., continuous improvement) (Lianto et al., 2018). On the practical side, the literature presents several approaches for implementing continuous DSI, with a wide variety of agile and lean methods and techniques (Agerfalk et al., 2009; Conboy, 2009; Humble & Molesky, 2011), including DevOps (Debois, 2011) as one of the most recent phenomena of managing continuous development and innovation in organizations.

Second, the S-D logic perspective (e.g., Vargo & Lusch, 2016; Lusch & Nambisan, 2015) highlights service innovation as a dynamic and interactive process (rather than an outcome) that is driven by actors' collaborative efforts to develop novel ways for value co-creation (VCC) by integrating their resources (such as time and skills) into the process. Value is considered co-created when the process results in an improvement in the well-being or viability of a participating actor (Vargo et al., 2020). However, it is important to recognize that continuous DSI also has the potential for adverse outcomes, that is, value co-destruction (VCD) (Li & Tuunanen, 2022; Plé & Chumpitaz Cáceres, 2010). Such VCD experiences can manifest as frustration and a lack of commitment to the DSI process at the individual actor level, which can also have an impact at the organizational level, such as not realizing the full VCC potential of continuous DSI. Lastly, in our definition, "digital" refers to the central or enabling role of digital technologies (artifacts) within the service and facilitating VCC by the actors engaging in the continuous DSI process.

Given the significance of continuous DSI for contemporary organizations, it is surprising how little is known about how VCC by focal actors (e.g., employees and customers) can be enabled in continuous DSI. As

the success of continuous DSI depends on the success of resource integration and service exchange between the participating actors, organizations must recognize how to manage such reciprocal VCC to maximize the potential of continuous DSI.

To address this gap and as a starting point for our efforts to enable VCC in continuous DSI, this paper presents findings from a thematic analysis of semi-structured interviews with 23 industry informants representing six digital service organizations in Finland. We address the following research question: *How can organizations manage continuous DSI to enable VCC?*

The primary objective of this paper is to gain an understanding of the continuous DSI phenomenon and VCC in that context as well as to provide practitioners with actionable insights for managing continuous DSI for VCC in organizations. As the first step in this direction, we analyze the reported enablers and hindrances of VCC in the studied organizations to present a preliminary framework of VCC in continuous DSI with three integral and interrelated dimensions: managing continuous operations, managing people, and managing resources.

Our findings contribute to the information systems (IS) and service research/management literature by advancing the understanding of S-D logic and VCC in the context of continuous DSI. In addition, we identify new avenues for research and practice for investigating and maximizing the VCC potential of continuous DSI in organizations. In industry, managers can use the provided knowledge to support the enabling factors and prevent unintended consequences of the DSI process by mitigating factors hindering VCC (and potentially resulting in VCD).

The rest of the paper is structured as follows. Next, we present the theoretical background focusing on continuous DSI and VCC (and VCD) in continuous DSI. Then, we present the methodology with descriptions of data collection and analysis, followed by our findings and preliminary framework. We conclude by discussing theoretical and practical implications, followed by limitations and suggestions for future research.

2. Theoretical background

2.1. Continuous DSI

Three interconnected dimensions underpin our understanding of continuous DSI. First, we adhere to the foundations of S-D logic (Vargo & Lusch, 2004, 2008, 2016) and understand service innovation as a process as opposed to an outcome. Specifically, we follow Lusch and Nambisan's (2015, p. 161) definition of service innovation as "the rebundling of diverse resources that create novel resources that are beneficial (i.e., value

experiencing) to some actors in a given context." Indeed, S-D logic emphasizes innovation as a dynamic and interactive process driven by actors' collaborative efforts to find or develop novel ways of creating value. Although the term "service innovation" can be used to describe the outcome of innovation, S-D logic emphasizes innovation as a dynamic and interactive process. By enabling novel ways for actors to co-create value, service innovation facilitates the development of new and/or improved service offerings, processes, and business models for organizations (Edvardsson & Tronvoll, 2013; Lusch & Nambisan, 2015).

Second, employing the presented definition of service innovation in the context of digital services, we discuss DSI. In other words, "digital" denotes the central or enabling role of digital technologies (artifacts) as part of the service and facilitating VCC by the actors engaging in the continuous DSI process. As with the organizations in this study, digital technologies have significantly altered the nature and structure of products and services, giving rise to novel value creation and innovation opportunities for organizations (Barrett et al., 2015; Nambisan et al., 2017; Yoo et al., 2012). Consequently, recent IS literature has emphasized a strong interest in uncovering and managing their innovation potential (Nambisan et al., 2017; Yoo et al., 2012).

The third dimension of continuous DSI defines continuity as systematic and continuous activity toward perceived short- and long-term benefits (for individuals and organizations) and the continuous development of capabilities to enable this (Lianto et al., 2018). This perspective is reflected in the S-D logic view of service innovation as a continuous, systemic process involving complex interactions among actors, activities, and resources (Mele et al., 2009). Similarly, Nambisan et al. (2017, p. 226) state that DSI "involves the continuous matching of the potential (or capabilities) of new and/or newly recombined digital technologies with original market offerings."

In addition, the term "continuous" is frequently associated with the level of innovation, that is, incremental (small and gradual change) versus radical (substantial change) (Hyland & Boer, 2006). Based on the existing literature, we find that these two go hand in hand. For example, Lianto et al. (2018, p. 772) define continuous innovation as the "continuous process in generating incremental or radical innovation combinations." Moreover, according to Steiber and Alange (2013), it is pointless to differentiate between radical innovation and incremental improvement because continuous innovation activities typically involve both.

In industry, organizations implement continuous DSI in a variety of ways. First, various agile methods

(e.g., eXtreme Programming, Scrum) are employed to increase organizations' and individuals' adaptability to frequent changes in the business environment (Fitzgerald & Stol, 2014). In recent years, it has become apparent that a holistic approach is required, that is, scaling the agile concept to encompass entire organizations. This has resulted, for example, in the creation of the scaled agile framework (SAFe) and the concept of "enterprise agile" (Fitzgerald & Stol, 2014, 2017). In addition, organizations have shown interest in the Lean methodology (Poppendieck & Poppendieck, 2003) as a means of optimizing resources, eliminating "waste," and achieving a continuous flow of innovation and development (Fitzgerald & Stol, 2014, 2017).

Recently, the development and operations (DevOps) approach (Debois, 2011) has gained popularity as a method for increasing the flexibility and efficiency of service development and innovation processes in organizations via the continuous and automated delivery of customer-requested features. DevOps aligns actors' incentives (particularly those of development and operations), fosters continuous collaboration, and relies on various continuous practices (such as continuous integration, deployment, and delivery) to reduce the time between committing a change and deploying it to production while ensuring high service quality, particularly in software-intensive service environments (Mäkinen et al., 2016). As a result, DevOps enables organizations to propose value rapidly and continuously to customers while enhancing customer understanding through frequent releases and rapid and continuous feedback (Ebert et al., 2016; Lwakatare et al., 2016).

The above-presented foundations serve as a sensitizing lens as we progress to the empirical phase of our study and gain a better understanding of VCC in continuous DSI.

2.2. VCC in continuous DSI

Based on S-D logic (Vargo & Lusch, 2004, 2008, 2016), we find that value in continuous DSI is co-created through interactive collaboration (i.e., service exchange) and the integration of resources among the actors involved in the process. Continuous DSI is viewed as a process wherein actors apply their resources for the benefit of others (or themselves), that is, for VCC (Vargo & Lusch, 2004). Zooming in on the level of an individual service organization, as the scope of this study entails, such actors can represent, for instance, employees performing various functions and customers as part of the innovation process. Value is viewed as an emergent, positive or negative, outcome of an actor's well-being or viability (Vargo et al., 2020), subjectively and dynamically determined by actors in their specific

contexts (Li & Tuunanen, 2022), and influencing their ability and/or willingness to engage in further VCC in the continuous DSI process.

While the concept of VCC emphasizes the positive side of actor-to-actor interactions, we must also consider the potential negative side of the resource integration process, namely VCD, to fully understand and support VCC for different actors (Li & Tuunanen, 2022; Lintula et al., 2018). Plé and Chumpitaz Cácers (2010) define VCD as the accidental or intentional misuse of an actor's resources or another actor's resources that results in a decline in the well-being of at least one of the participating actors. Considering the possibility of VCD provides a crucial understanding of value formation in continuous DSI environments and the fact that interactive collaboration may have unfavorable consequences for individuals and organizations (Li & Tuunanen, 2022).

Lintula et al. (2017) found that VCD consists of three interrelated dimensions: orientation, resources, and perceptions, which are comprised of nine VCD components that can exist before, during, and after the service process. In a continuous DSI setting, the orientation dimension includes actors' intentions and goals for the process; the resource dimension refers to the lack, misuse, and/or loss of resources in the process; and the perceptions dimension establishes actors' prior expectations as the basis for VCC or VCD. Echeverri and Skålén's (2011) definition of "incongruence of applied practices" is incorporated into the perceptions dimension. For example, if two actors have very different views and ways of acting as part of the continuous DSI process, the result can be VCD.

Recent research suggests that VCC and VCD are closely related and should be studied jointly (e.g., Li & Tuunanen, 2022). Li and Tuunanen (2022) suggest that resource integration (access, matching, and resourcing) and social interaction (communication, dialogue, and trust) are the two interdependent processes that lead to either VCC or VCD, depending on the alignment of practices among actors. Consequently, both VCC and VCD are considered potential outcomes of the interactive value formation in the organizations' continuous DSI processes in this study. Although we do not focus on the value outcomes themselves, we investigate both the enabling (increased potential for VCC) and hindering (increased potential for VCD) sides of the continuous DSI process to outline the integral management dimensions for enabling VCC in organizations.

3. Methodology

We employed a qualitative and inductive research approach (Gioia et al., 2013) to determine the enabling

and hindering factors of VCC in continuous DSI and to derive insights into the management of continuous DSI in organizations. We collected the data via semi-structured interviews with six medium and large-sized service organizations (see Table 1). As a criterion, we anticipated that the organizations would pursue continuity in their service development and innovation activities and operate within the context of digital or digitally enabled services. To avoid industry bias and obtain diverse perspectives on VCC in continuous DSI, we included service organizations from a variety of industries.

The informants from each organization were selected with assistance from the company representatives based on their knowledge and suitability for the research. In some organizations, the company representatives themselves also served as informants. The informants held various roles, but a common expectation was knowledge of both the strategic and operational aspects of continuous DSI in the organization. Based on availability, two to six informants from each company were interviewed between August and October 2021, yielding 23 interviews (13 men, 10 women; ages 25 to 57; 9+ years of average experience in the company/current role).

Industry	Size	*	Informant roles
IT services and consulting	23,000+ employees (global; 20 countries)	4	Lead Business Developer, Head of Advisory (Design and Innovation), Head of Innovation, Head of R&D
Telecommunications, ICT, and online services	5,000+ employees	2	5G Development Director, Startup Analyst
Industrial and fiber laser equipment	70+ employees (Finland); global parent company 4,800+ employees	4	CEO, Senior Global Service Account & Market Manager, Director (Infrastructure and Service), Product Line Manager
HR service solutions	300+ employees	6	Development Director, Business Development Manager, Development Manager (2), HR Manager, Director (Industry)
Textile rental service	4000+ employees (global; 24 countries)	3	Development Manager, Service Owner, Director (Service Concepts)
Language services and language management solutions for digital environments	150+ employees plus 2 000+ freelance experts	4	Service Manager, Account Manager, Solution Architect, Chief Solutions Business Officer

* Number of informants

Table 1. Organizations and informants

All interviews followed the same interview guide (Patton, 2002), which included four main themes (1. current state and perspectives on service development and innovation within the organization, 2. perceptions of continuity and how it is reflected in practice in the development and innovation activities, 3. focal (internal/external) stakeholders, and 4. digital technologies and continuous service innovation) with complementary open-ended questions. The interviews lasted between 45 and 80 minutes and were conducted

via an online video conferencing tool due to the COVID-19 pandemic. The interviews were recorded and transcribed. As the interview themes show, various perspectives on continuous DSI were discussed during the interviews. However, this paper focuses on identifying the enablers and hindrances to VCC, as reported by the informants. To gain insight into these, informants were asked about their experiences regarding the factors that, from their perspective, supported or hindered VCC (i.e., value-adding cooperation and resource integration) in their organization's continuous DSI processes.

We followed Gioia et al.'s (2013) recommendations to conduct a systematic inductive analysis to develop our preliminary framework. The analysis was carried out by two authors. Although the first author was primarily responsible for coding and analysis, the authors met weekly (four 1.5-hour meetings) to discuss the analysis progress. The second author reviewed and evaluated the coding and interpretations at each stage. In addition, the third author was consulted on the development of the analysis, especially during the final stages and the completion of the data structure (Figure 1).

The qualitative data analysis tool Atlas.ti was utilized for the open coding of the first-order concepts. Initially, the codes were specific of the informants' descriptions, but in later phases, codes that were highly similar were merged, resulting in a total of 30 first-order concepts. Based on their reported supporting or hindering role of VCC in the continuous DSI process, the developed concepts were further classified as positive (+) or negative (-). Furthermore, the numbers after the concepts show the number of codes they comprise. In the second phase, we examined similarities between the emerging concepts and combined them to form second-order themes (i.e., VCC management categories). The themes were further discussed and grouped into third-order dimensions to complete our data structure (Figure 1), which informs the preliminary framework of the study, presented in Figure 2.

4. Findings

Our preliminary framework identifies three key areas of managing VCC in continuous DSI: managing continuous operations, managing people, and managing resources. The framework depicts the three management dimensions in the continuous DSI process as well as their outlined impact on the value outcomes (VCC/VCD) experienced by actors in the process and their impact on actors' willingness or ability to continue engaging as active members in the continuous DSI process. Thus, in addition to outlining the three management dimensions, the framework explicates why
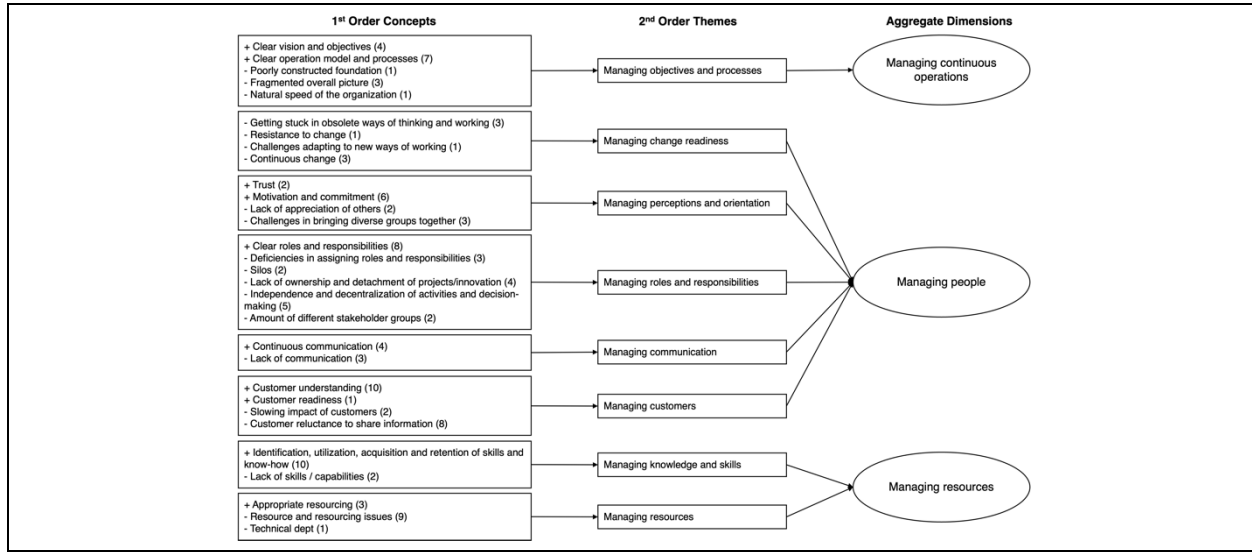
Figure 1. Data structure (adapted from Gioia et al., 2013)

these aspects are important to manage in the continuous DSI process. In the following subsections, we elaborate on our findings regarding the three management dimensions.
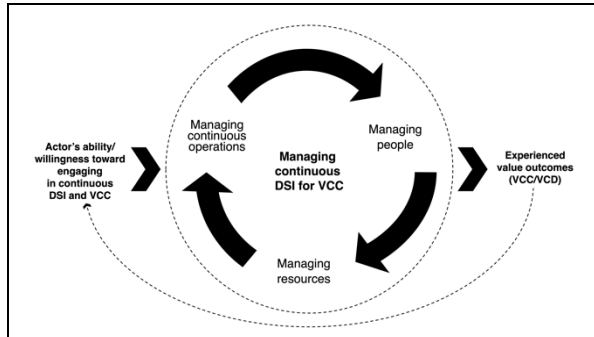

Figure 2. A preliminary framework for managing continuous DSI for VCC

4.1. Managing continuous operations

Managing continuous operations involves managing the organizational-level objectives and processes for DSI. The found VCC-enabling concepts include a clear vision and objectives as well as a clear operational model and processes. A poorly constructed foundation, a fragmented overall picture, and the organization's natural speed were identified as potential VCC hindrances.

Regarding clear vision and objectives, goal setting and its active organization-wide communication to achieve a unified direction were cited as necessary for enabling VCC in continuous DSI. Setting goals necessitates the establishment of a clear strategic direction and vision, which can be communicated, for

example, through roadmaps to foster a shared understanding of the direction of and expectations for continuous DSI activities in practice. As described by informant 5: "*I consider this type of roadmap thinking to be very effective. We must have a clear vision of where we're going and what we're aiming for, and this begins with the business and the type of business we're aiming for…it is a shared vision derived from our strategy; we must have a shared direction and story as people enjoy stories. This is how we communicate and concretize the direction we're headed. And then there is continuous innovation toward that vision.*"

In addition to clear objectives and vision, managing VCC in continuous DSI requires synchronizing and clearly communicating about the selected operating models, methods, and processes. In keeping with this, informant 5 continues: "*In order for this type of continuous development, continuous innovation, and other continuous capability building to be effective, we must first structure and synchronize our methods, like 'this is how we do things.'*" Clearly communicated strategy and objectives, operating models, and practices enable VCC in continuous DSI by managing expectations and providing a common direction for the DSI activities. However, identified hindering factors, such as the fragmented overall picture resulting from agile and continuous ways of working, may present challenges and increase the likelihood of VCD. For example, informant 21 described the challenges as follows: "*Maybe it feels like the overall picture is a little thin at times. We may end up doing something like an agile little fix, but not from the perspective of the overall architecture or anyone else, so it may not be the best way. Where to properly pause to take in the big picture…?*"

4.2. Managing people

When analyzing the management of continuous DSI for VCC, we discovered that the most important and extensive aspect is managing people. This finding is consistent with the S-D logic's emphasis on the importance of people as value-proposing and determining actors in the DSI process. Managing change readiness, managing perceptions and orientation, managing roles and responsibilities, managing communication, and managing customers are the five primary management categories for this dimension.

Managing change readiness comprises two perspectives. First, many organizations, including a number of those interviewed for this study, are still in the process of reforming their strategy, operating models, and practices to enable continuous DSI. We identified getting stuck in obsolete ways of thinking and working, resistance to change, and difficulty adapting to new ways of working as potential hindrances to VCC concerning such transformation. As informant 5 explains: "*There is a quite lot of resistance to change, and people may not comprehend the need for service development to happen extremely close to the customer. And that requirement for fast action. There is still a minor pain point within our organization to comprehend that the task priorities can change rapidly.*"

Consequently, managing employees' readiness for change and acclimating them to new work expectations and practices is critical to enabling VCC in continuous DSI. In this regard, it is also deemed critical to obtain the support of upper management, whose commitment indicates the direction for others. The second perspective relates to a defining characteristic of continuous DSI, namely the dynamic operating environment. According to informant 15: "*it is important to make sure there won't be exhaustion in the fact that things change all the time because that, too, can be consuming.*" Indeed, value may be destroyed rather than created if an employee perceives continuous change as stressful and is unable or unwilling to integrate their resources into the continuous DSI process and VCC with others. Thus, managing change readiness is crucial also from the perspective of continuous change in the context of continuous DSI.

Managing perceptions (how actors perceive others and the DSI environment) and orientation (how actors are oriented toward DSI activities, including their attitudes and goals) encompasses concepts such as trust, motivation, and commitment in continuous DSI. Regarding actors' perceptions, for example, trust emerged as an enabling factor for VCC by fostering teamwork: "*Of course, as always in teamwork, the biggest enabler is trust, accountability*" (informant 16). Furthermore, commitment was found to be an important aspect of how actors orient themselves toward continuous DSI and VCC: "*Everyone is needed, and everyone's skills and vision in this continuous development are crucial, as well as getting people committed to it*" (informant 3). Informant 8 reminds that an individual's motivation affects their commitment to the DSI process and VCC: "*It depends on people; some are more eager to collaborate and develop, while others prefer to focus on other things, which has a significant impact.*" Regarding orientation, the interviews also revealed the VCC hindrance of people not appreciating each other's value: "*It's likely that all organizations still have something to do with everyone understanding each other's value and why we're here*" (informant 4). Failing to recognize the value of others is, without a doubt, a potential VCC hindrance in all types of businesses and operating environments. Nonetheless, as continuous development and innovation models stress bringing together individuals from various organizational functions, the challenge can be viewed as especially significant and anticipated from the standpoint of continuous DSI.

The informants also discussed additional obstacles in bringing together diverse cultures, competencies, operating environments, and understandings within organizations. Informant 3 describes the following: "*[When you] have to explain something self-evident, it can be a little frustrating because you've been operating in this environment A, and another has operated in environment B; it's highly unlikely that they've ever encountered each other and identifying and understanding each other's operating environment and logic can be difficult.*" Informant 4 continues: "*There is always room for improvement in the cooperation between people from different cultures and skill sets. Yes, in a sense, it is a challenge for the businesspeople who enter this process because they cannot fathom what it takes to get a feature into production.*" Also, the different languages used in different parts of organizations (e.g., IT and business functions) were identified as posing potential challenges to VCC: "*It is common for customer service and technological development to speak different languages*" (informant 10).

Multiple concepts regarding managing roles and responsibilities were identified. Several informants mentioned clear roles and responsibilities as supporting VCC in continuous DSI; however, several hindering factors also emerged, including deficiencies in assigning roles and responsibilities, remaining in silos, lack of taking ownership over and detachment from projects/innovation, the independence and decentralization of activities and decision making, and

managing the number of stakeholder groups participating in the DSI activities. As interviewee 17 states, it is essential "*that it's super, super clear what is everyone's role in the whole process,*" and interviewee 12 continues, "*we will probably go a long way with clear responsibilities and good forums.*" Several informants highlighted the importance of a champion, someone who drives continuous DSI and generates VCC opportunities within the organization: "*One of the biggest enablers is perhaps having a champion or someone who really helps to drive that business…always when we have this strong person who is the champion, then we find that we are getting strong results…I would say the key enabler is having that person who is just really driven toward what innovation we're making*" (informant 17).

As an example of the potential hindrances associated with roles and responsibilities, the independence and decentralization of operations and decision making in an organization managed by continuous development methods (e.g., DevOps) can pose difficulties, as shared by informant 13: "*It is evident that decision making is fragmented. The fact that the operation is agile also poses the difficulty of determining who will make the major decisions in the end and how to ensure that the line is consistent... When optimizing a specific value chain, agility is a fantastic asset. But when you must view things through the lens of the entire business architecture, it becomes extremely difficult.*"

As the fourth category under the dimension of managing people, our findings highlight the importance of managing communication in continuous DSI processes. In this regard, the interviews revealed both enabling and hindering experiences: "*I would still say the enabler is regular communication no matter what channel you are using. It's just you need to consistently communicate*" (informant 16). Regarding the hindering effects of lack of communication, informant 19 stated: "*Lack of communication is a big pitfall, if communication is not handled properly, then of course it is not possible to have such global operation…in these processes there is always room for development, such as how information is transferred between functions*."

Finally, in the context of continuous DSI, managing customers comprises elements related to customer management, such as "relationships," "trust," "cooperation," and "understanding." Despite the used term, we do not suggest that customers themselves could be "managed"; rather, the term was chosen for the category due to its diverse customer-related concepts. Furthermore, concerning the findings, it is important to note that in this study, VCC is viewed from the organizations' continuous DSI process management perspective, that is, aspects related to customer experience and attained value through service use are omitted. With this delineation in mind, the interviews emphasized, for example, the importance of customer understanding as a driver of VCC. For instance, informant 10 discussed, "*I believe it is crucial to have a deep understanding of the company's objectives, vision, and desired path to success. However, because businesses provide services to their customers, it is crucial to also understand the future direction of the market.*" Informant 13 emphasizes the significance of continuous customer dialogue and proactive customer service in the context of continuous customer deliveries: "*If we have smart customer account managers, they steer the customer dialogue in the direction of holding meetings with the customer, at least according to the strategy or the annual clock, to consider continuous service development together [with the customer] and proactively suggest how things can be improved.*" A further illustration is provided by informant 5, who emphasizes customer and market understanding as a key enabler of continuous DSI toward a specified vision: "*It is created through customer understanding, which is an important pillar, but the other is that we have these permanent, continuous development teams, which is also an organizational enabler. Those are possibly the two pillars. That we fundamentally enhance customer and market understanding of the specifics of how to do it. Then we have a machine that can develop the product while also learning what the market demands. These are mutually supportive aspects.*"

The readiness of customers for continuous DSI was also highlighted: "*And then, of course, the customers must be prepared in terms of requirements if you want an agile deployment project,*" informant 21 explains; "*it must be written into the contract, and the customer must be prepared for it; they cannot say, 'Yes, we want you to develop this in an agile manner' only to discover that they…[aren't ready for it].*" Another found VCC hindrance in continuous DSI was customers' reluctance to share information and commit to continuous tracing. For example, regarding continuous customer data access, informant 19 shared: "*Yes, we have the ability and capability to do so, and we already have feedback capabilities in [systems] that can be used to monitor certain parameters and adjust them so that the customer experiences no interruptions or problems. But then there's the process data and getting that data, which is so limited as large customers are careful of their own data...After all, it's quite rare to be able to keep that data link open all the time, and even if it technically can be done in a variety of ways, the customer does not want it done.*"

4.3. Managing resources

The third dimension of our preliminary framework is the management of resources. The first category of the dimension examines the role of identifying, utilizing, acquiring, and retaining skills and expertise in enabling VCC in continuous DSI, as well as the role of a lack of skills/capabilities in hindering it.

As an enabler of VCC in continuous DSI, informant 4 stresses the significance of open and honest competency identification: "*Perhaps [we need] more honest and transparent identification of competencies, what capabilities we require, so that we can have the best possible continuous development, improve, and stay current...*" In this regard, informant 20 emphasizes: "*[We] need capabilities to do new things across the organization, so it's imperative that we know as well as possible internally where the best experts and technologies can be found for certain things.*" Also, competence development and training are deemed essential in enabling continuous DSI: "w*e need to remember always that it's not that you learn something, and you can use it forever. Technology is changing and it's changing very rapidly, so you need to train your skilled people*" (informant 23).

In continuous DSI, the lack of skills can manifest as bottlenecks in the process and as hindrances to VCC. For instance, informant 4 describes: "*Technical expertise is frequently a bottleneck that slows things down. Obviously, it is not sufficient to have merely technical experts, but perhaps the most difficult thing to conceive from a business perspective is what it takes to make even some of our wildest dreams a reality.*" As stated previously, such challenges in competences and understandings can also lead to conflicts between different groups of actors, making the identification and promotion of competences a crucial aspect of managing resources for VCC.

Additionally, informants brought up resources and resourcing in a more general sense. In continuous DSI environments, it is found important that there are not too many things to work on at once: "*Of course, there must be a sufficient amount of work to do, so that there is an agile opportunity to concentrate on a few things at once*" (informant 21). Also, securing resources is viewed as one key enabler of value creating continuous DSI: "*Securing resources, securing budgeting so that people can really do agile...so that typical organizational delays do not become an obstacle to agile and continuous innovation*" (informant 5).

Among the current challenges of resources and resourcing, informants mentioned, for example, the workload as a potential hindrance to VCC: "*Even distribution of workload is quite difficult; you can easily place the burden on certain individuals, experts in a particular field, or managers of specific functions*" (informant 19). Insufficient human and financial resources, as well as scarce resources, were also identified as hindrances to continuous DSI and VCC: "*Resource insufficiency is our challenge. Developing and implementing everything in this [continuous] manner requires human labor, in my opinion. This is our greatest obstacle*" (informant 12); informant 6 adds in regard to the consequences, "*When working with limited resources, everything is constrained and slowed down.*" Finally, technical debt emerged as one of the resource hindrances requiring attention for enabling continuous DSI: "*The fundamental barrier to disruption is having a great deal of technical debt in the background, that is, old systems that must be replaced before a change can be made*" (informant 13).

5. Discussion and concluding remarks

This paper presents a preliminary framework that depicts three integral and interdependent dimensions of managing continuous DSI for VCC in organizations, namely managing continuous operations, managing people, and managing resources. Concerning the first management dimension, it was determined that well-communicated strategy and vision, objectives, operating models, and practices facilitate VCC in continuous DSI by managing expectations and providing a unified operational direction. An inadequately constructed foundation, a fragmented overall picture, and the natural speed of organizations may pose hindrances and increase the probability of VCD.

Prior research (e.g., Lintula et al., 2018; Smith, 2013), although conducted primarily from the perspective of service users/customers, has found that actors' expectations for the service have a significant impact on the outcome of the VCC process. VCD may occur if the expected value is not fulfilled. Moreover, the (in)congruence of applied practices has been found to influence the perceived value outcomes (Echeverri & Skålén, 2011). Our findings extend this understanding by providing novel insight into how actors' expectations and the alignment of practices can be managed to enable VCC and mitigate the risk of VCD in the continuous DSI process.

Further, it was determined that managing people is the most significant and extensive aspect of managing DSI for VCC. This finding is consistent with the S-D logic's (Vargo & Lusch, 2004, 2008, 2016) emphasis on individuals as value-proposing and determining actors in the continuous DSI process. The five management categories identified for this dimension were managing change readiness, perceptions and orientation, roles and responsibilities, communication, and customers. These categories broaden the current understanding of how to

manage people to enable the creation of value in continuous DSI processes. In addition, there are also significant connections in this category to prior literature. In a recent article by Li and Tuunanen (2022), actors' social interaction was deemed to necessitate trust, communication, and dialogue between actors. Our findings emphasize the significance of all of these in managing people for VCC.

Moreover, in line with previous research, the significance of resources and resource integration in enabling VCC in continuous DSI processes, such as managing the identification, utilization, acquisition, and retention of skills and expertise in an organization, was highlighted. Whereas prior research identifies resource integration (e.g., access to and matching of resources, and resourcing) as essential (Li & Tuunanen, 2022) and suggests the lack, misuse, and/or loss of resources in the service process as potential reasons for VCD (Lintula et al., 2017), our findings provide new empirically based insight into what the aspect of managing resources entails in the continuous DSI context.

Our findings contribute to research and practice in multiple ways. First, we advance the understanding of S-D logic (Vargo & Lusch, 2004, 2008, 2016) and the concept of VCC (and VCD) within the context of organizations' continuous DSI processes. We show that the lens of S-D logic is well suited for understanding and studying the organization's continuous DSI processes and VCC in this context. Employing the S-D logic lens, we generate a novel understanding of the enablers and hindrances of VCC in continuous DSI and provide managers with actionable insights into how continuous DSI can be managed to enable VCC in their organization.

Second, our findings suggest new research avenues for examining and optimizing the VCC potential of continuous DSI in organizations. For example, each identified dimension could be examined in greater depth as a separate entity to provide a more profound understanding of each. Furthermore, whereas the focus of this study was on the organizations' DSI processes and internal informants, future research could focus on studying the customer perspective, that is, how the continuous change and evolution of digital services, characteristic of continuous DSI, affect customers' experience or how customers could be better engaged in the continuous DSI process. In addition, as today's organizations rarely develop and innovate their services in isolation, zooming out from the level of a single organization to larger ecosystems and partner networks could provide valuable insight into how the management of continuous DSI and VCC changes in such contexts.

As another suggestion for future research, we propose taking the role of technology in continuous DSI into greater focus. Whereas for this study, the role of technology and the digitality of the studied organizations primarily established the context, future research should investigate the role of technology as a driver of innovation and value creation in continuous DSI processes. It is important to comprehend the role and impact of novel technologies as part of the continuous DSI process, especially as their importance to services and processes grows. Further, we argue that the IS field, with its emphasis on the interrelationships between people, processes, and technology, is uniquely positioned to investigate such issues.

As for implications for practice, managers can utilize the presented framework and the industry informants' experiences to support the enabling factors and prevent the unintended outcomes of the continuous DSI process by mitigating the factors hindering VCC (and potentially resulting in VCD) in their organization. The presented management dimensions, categories, and VCC concepts allow managers to evaluate the extent to which the identified enablers are realized in their service development processes. Furthermore, it is just as important, if not more so, to identify the hindrances that must be mitigated to strengthen VCC and realize the value potential of continuous DSI in organizations.

Our study also has limitations. First, it should be noted that while the presented findings in this paper provide an intriguing first understanding of continuous DSI in organizations and outline the first important management insights, the findings and the presented framework are still considered preliminary. Especially at the concept level, it is evident that the examples from the interviews are not exhaustive and that further research is necessary. In this vein, we are currently conducting a second round of interviews with the study organizations with a specific focus on operational-level DSI activities and the factors that enable and hinder VCC in the process. Consequently, we anticipate that the findings presented in this paper will be refined, and new concepts will emerge to enhance the explanatory power of the presented framework. In addition, while in this paper, each informant was treated as an individual industry expert with diverse organizational backgrounds and roles, the more extensive dataset will allow us to conduct a cross-case analysis to examine the similarities and differences in practices and experiences across the studied organizations.

Second, we acknowledge that our study is limited in terms of investigated organizations. While we included service organizations from various industries to avoid industry bias and obtain diverse perspectives on VCC in continuous DSI, we acknowledge that further research is required to generalize and theorize the findings. While we continue our investigation into the phenomenon, we invite others to join us.

6. Acknowledgements

7. References

Agerfalk, P. J., Fitzgerald, B., & Slaughter, S. A. (2009). Introduction to the Special Issue—Flexible and distributed information systems development: State of the art and research challenges. *Information Systems Research*, *20*(3), 317–328.

Barrett, M., Davidson, E., Prabhu, J., & Vargo, S. L. (2015). Service innovation in the digital age: Key contributions and future directions. *MIS Quarterly*, *39*(1), 135–154.

Conboy, K. (2009). Agility from first principles: Reconstructing the concept of agility in information systems development. *Information Systems Research*, *20*(3), 329–354.

Debois, P. (2011). DevOps: A software revolution in the making? *Cutter IT Journal*, *24*(8), 3–5.

Ebert, C., Gallardo, G., Hernantes, J., & Serrano, N. (2016). DevOps. *IEEE Software*, 94–100.

Echeverri, P., & Skålén, P. (2011). Co-creation and co-destruction: A practice-theory based study of interactive value formation. *Marketing Theory*, *11*(3), 351–373.

Edvardsson, B., & Tronvoll, B. (2013). A new conceptualization of service innovation grounded in S-D logic and service systems. *International Journal of Quality and Service Sciences*, *5*(1), 19–31.

Fitzgerald, B., & Stol, K. J. (2014). Continuous software engineering and beyond: Trends and challenges. *1st International Workshop on Rapid Continuous Software Engineering*, 1–9.

Fitzgerald, B., & Stol, K. J. (2017). Continuous software engineering: A roadmap and agenda. *Journal of Systems and Software*, *123*, 176–189.

Gioia, D. A., Corley, K. G., & Hamilton, A. L. (2013). Seeking qualitative rigor in inductive research: Notes on the Gioia Methodology. *Organizational Research Methods*, *16*(1), 15–31.

Humble, J., & Molesky, J. (2011). Why enterprises must adopt Devops to enable continuous delivery. *Cutter IT Journal*, *24*(8), 6–12.

Hyland, P., & Boer, H. (2006). A continuous innovation framework: Some thoughts for consideration. *CINet*, 389–400.

Li, M., & Tuunanen, T. (2022). Information technology–Supported value co-creation and co-destruction via social interaction and resource integration in service systems. *The Journal of Strategic Information Systems*, *31*(2), 1–19.

Lianto, B., Dachyar, M., & Soemardi, T. P. (2018). Continuous innovation: A literature review and future perspective. *International Journal on Advanced Science, Engineering and Information Technology*, *8*(3), 771–779.

Lintula, J., Tuunanen, T., & Salo, M. (2017). Conceptualizing the value co-destruction process for service systems: Literature review and synthesis. *Proceedings of the 50th Hawaii International Conference on System Sciences*, 1632–1641.

Lintula, J., Tuunanen, T., Salo, M., & Myers, M. D. (2018). When value co-creation turns to co-destruction: Users' experiences of augmented reality mobile games. *Proceedings of the 39th International Conference on Information Systems*, 1–17.

Lusch, R. F., & Nambisan, S. (2015). Service innovation: A service-dominant logic perspective. *MIS Quarterly*, *39*(1), 155–175.

Lwakatare, L. E., Kuvaja, P., & Oivo, M. (2016). An exploratory study of DevOps: Extending the dimensions of DevOps with practices. *The 11th International Conference on Software Engineering Advances*, 91–99.

Mäkinen, S., Leppänen, M., Kilamo, T., Mattila, A.-L., Laukkanen, E., Pagels, M., & Männistö, T. (2016). Improving the delivery cycle: A multiple-case study of the toolchains in Finnish software intensive enterprises. *Information and Software Technology*, *80*, 175–194.

Mele, C., Colurcio, M., & Spena, T. R. (2009). Alternative logics for innovation: A call for service innovation research. *Proceedings of the Naples Forum on Service Conference*.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital innovation management: Reinventing innovation management research in a digital world. *MIS Quarterly*, *41*(1), 223–238.

Patton, M. Q. (2002). *Qualitative research & evaluation methods* (3rd ed.). Sage Publications, Inc.

Plé, L., & Chumpitaz Cáceres, R. (2010). Not always co-creation: Introducing interactional co-destruction of value in service-dominant logic. *The Journal of Services Marketing*, *24*(6), 430–437.

Poppendieck, Mary., & Poppendieck, Tom. (2003). *Lean software development: An agile toolkit*. Addison-Wesley.

Smith, A. (2013). The value co-destruction process: A customer resource perspective. *European Journal of Marketing*, *47*(11/12), 1889–1909.

Steiber, A., & Alänge, S. (2013). A corporate system for continuous innovation: The case of Google Inc. *European Journal of Innovation Management*, *16*(2), 243–264.

Vargo, S. L., Koskela-Huotari, K., & Vink, J. (2020). Service-dominant logic: Foundations and applications. In *The Routledge handbook of service research insights and ideas* (pp. 3–23). Routledge.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of Marketing*, *68*, 1–17.

Vargo, S. L., & Lusch, R. F. (2008). Service-dominant logic: Continuing the evolution. *Journal of the Academy of Marketing Science*, *36*(1), 1–10.

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: An extension and update of service-dominant logic. *Journal of the Academy of Marketing Science*, *44*(1), 5–23.

Yoo, Y., Boland, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization Science*, *23*(5), 1398–1408.