Improvisation as a prerequisite for the dynamic interplay of Production and Service in PSS: Insights of an organizational design principle and a game-based learning approach

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Abstract

The concept of improvisation is discussed in management literature as a promising mechanism and design principle for an organization’s capacity for learning, adaptability and innovation. However, a specific form of improvisation for coping with the duality of production and service has not yet been applied to the servitization of manufacturing or PSS. This paper introduces a specific form of semi-structured improvisational learning related to PSS-oriented organizations. It introduces an organizational design principle of desired and accepted improvisational actions for highly individualized customer solutions. This semi-structured form of improvisational learning separates PSS from manufacturing-oriented organizations, where improvisation is rather a phenomenon of resistive actions that trigger undesired deviations. By emphasizing the increasing importance of improvisation and improvisational learning as a desirable and acceptable principle of action, it is argued that this rather paradigmatic shift demands specific capabilities from individual actors in PSS. These individual capabilities are summarized in this paper as learning-oriented capabilities that unfold a dynamic balance of generative and adaptive learning activities in PSS. As this specific pattern of individual capabilities is less cultivated in pure manufacturing, a game-based training and learning approach is introduced which is designed to accompany individual actors during the servitization process. The game-based learning scenario focuses on the development of individual improvisational capabilities as a mediating force in the dynamic triangle of customer, production and service. In conclusion, the literature review of this paper contributes to the scientific community by framing the servitization of manufacturing with the concept of improvisation as a coping strategy for the dynamics and ambiguity in PSS. Furthermore, a training and development approach is specified that aims at equipping individual actors with capabilities of improvisation and improvisational learning as prerequisites for the operation of highly individualized PSS. This training approach is also intended to be applicable for practitioners.

1. Introduction

A Product-Service System (PSS) is an integrated offering that builds on the mutual adjustment of products and services with the scope of delivering a specific value-in-use for customers [1]. Despite the various challenges for organizations [e.g. 2,3] which aim towards a PSS offering, huge advantages of shifting a firm’s business activities towards PSS are seen in the generation of higher and more constant revenue streams for providers as well as in general ecological, environmental and social benefits [1,4]. The PSS approach is discussed as especially promising for rather traditional manufacturing companies in western economies as their product-based competitive advantages are vanishing in today’s globalized markets [4,5]. However, the transformation towards a PSS provider, particularly for these organizations, requires extensive organizational development and learning processes [e.g. 2,3,6,7]. This is related to significant
transformational challenges regarding organizational structures, processes, routines and capabilities [see e.g. 8]. Manifested operational systems and organizational processes become more complex to manage and to coordinate as well as more contradictory [9]. Thus, a number of authors agree on the coexistence of a service unit next to production to establish a service-oriented counterpart of organizing for the servitization of manufacturing [9,10]. Through this dualistic organizational design principle, PSS providers aim at gaining the capabilities for more customer-specific individualized offerings, without completely replacing the product-related manifestations, such as a high degree of standardization and structural orientation [see e.g. 6,9,10,11]. This coexistence of two rather opposing logics of organizing is established for coping with the demands of a mutual adjustment between production, service and the customer along the PSS lifecycle [11,12,13]. Treating production and service as a duality underlines their simultaneous coexistence and their interdependent relationship in PSS. This determines a PSS-specific field of organizational tensions that demands new forms of communication, collaboration and knowledge integration activities between production and service [14]. Therefore, a duality-oriented design principle as a coping mechanism for the contradictions in the interplay of production and service is seen as prerequisite for an organization’s success and sustainability [15,16]. This duality lens provides a source for the unfolding of new opportunities and solutions for further innovation and knowledge integration, which are important antecedents for customer-specific offerings [16,17]. By considering PSS as a constructive dualistic entity of opposing but value-oriented coexisting logics, we argue that specific learning mechanisms for the dynamic recombination of production and service routines have to be developed. These learning mechanisms could help to cope with the rather paradoxical tensions between production and services by unfolding routines of consideration and identification of appropriate valuable elements for PSS delivery [17]. However, the prerequisite of constructively coping with opposing logics in organizations is a dynamic balance between adaptive and generative learning activities, which are described in literature as improvisational actions [18,19]. Thus, improvisation as an action- and learning-oriented conception is supposed to build a crucial mediating force, as well as a catalyst for a PSS-oriented dynamic interplay between production and service. It triggers activities of altering, revising, creating and discovering innovative solutions in order to solve new customer problems by adjusting production- and service-oriented logics [19]. However, while improvisation is regarded as a promising coping and learning strategy in highly dynamic and contradictory organizational environments [16,19], there is a demand for specific individual capabilities of learning, as well as organizational design principles, which frame the process and the output of improvisational activities [20]. While the concept of improvisation as a coping mechanism for the operation of a PSS offering seems to be a promising approach in the tension field determined by the dynamic interplay of production and service, there is less knowledge about a PSS-specific form of improvisational learning, its framing by organizational design principles and how a PSS-specific form of improvisational learning can be developed by an appropriate approach. In order to address this research gap, this paper provides first insights about a PSS-specific form of improvisational learning as an organizational design principle that underlines the dynamic interplay between production and service in order to offer highly individualized customer solutions. Furthermore, the paper outlines how this form of learning is separated from pure product orientation. In addition, first insights about a transfer of the scientific knowledge into a PSS-related game-based training tool for supporting individuals in adapting the PSS-related form of improvisation learning to their daily business activities is discussed. The theoretical framework is based on state-of-the-art literature about improvisation as an enabling element for learning and renewal in organizations. The proposed PSS-specific form of improvisational learning introduced by this paper is traced back to results of recent empirical research among German engineers and the PSS and servitization literature. In summary, the paper aims to contribute to the research agenda about PSS and servitization by providing further knowledge to fill the gap concerning how firms can adopt and implement the PSS concept into their operations by focusing on specific organizational design elements of improvisational learning. It also discusses further insights about the PSS transition and how it can be managed and accompanied. Last but not least, the call by practitioners for tools and techniques applicable to support the organizational design and transformation is addressed by the outlook of a game-based scenario approach as a training tool for individuals.

2. Theoretical framework

This paper builds on the concept of improvisation discussed in literature as an appropriate coping mechanism for highly dynamic and contradictory forms of organizing [21], such as PSS, where elements from contrary logics, production and service have to be mutually adjusted for integrated customer solutions within intense learning processes [1,2,7,14]. Thus, the main research questions of this paper are: How can a PSS-oriented type of improvisational learning as an organizational design principle be specified, which related coping mechanisms at the level of individual actors are likely to occur in PSS and how can the underlying capabilities be developed? Guided by these research questions, the theoretical framework first elaborates on the concept of improvisation as an enabling force for the organizational transformation and ongoing renewal of manufacturing, followed by a recent systematization of four forms of improvisational learning in different organizational contexts [20] and their contextualization by PSS.

2.1. Improvisation in organizations

The concept of improvisation has gained increasing awareness in management literature with regard to competitive actions and learning repertoires in organizations, as well as a promising source for organizational renewal
processes in dynamically changing market situations with fluid customer demands [21]. As an enabling approach for ongoing organizational change and renewal, improvisational activities can permeate rule-governed systems through reflection-in-action [22], while being framed by goals and social–organizational implications [23]. Three dimensions further characterize improvisation in the sense of an action-oriented concept: It has a purpose, it is extemporaneous and it occurs during action [24]. From a learning perspective, Vera and Crossan (2007) outline that improvisational actions are a potential route to learning as changes in behavior precede changes in cognition [25]. Thus, improvisation is regarded as a mechanism through which individuals and organizations accomplish routine braking or renewal. With regard to PSS or servitization and the increasing demand for individualized customer solutions, improvisation as the concept of framed routine-breaking actions provides an additional source for innovative outcome through the combination of production and service as complementary entities [19]. Furthermore, improvisation can be described as a spontaneous as well as creative process of actions that follows a specific objective, such as the generation of new solutions for new customer problems in PSS. Nevertheless, it is important to mention that “improvisation is not inherently a good thing” [18, p. 131] and can also lead to negative outcomes for the organization. While improvisation capabilities are path-breaking capacities to recognize external and extemporaneous stimuli differently, and transform them into opportunities through previous knowledge [26,27], they can be framed by an organizational design principle, such as the overall purpose of customer orientation. As a capacity of path-breaking and -recognizing, improvisation implies a source for the reconfiguration of individual capabilities, organizational routines and knowledge in order to develop new principles of organizing as well as new solutions for new problems [25, 28].

2.2. Forms of improvisational learning

Improvisation and improvisational learning in organizations is characterized “as a dynamic, complex and rich multiform process” [20, p. 2], for which Cunha et al. (2014) developed a systematization of four forms of improvisational learning and their likely appearance in different contexts of organizing. The authors describe these four forms as resistive, subversive, semi-structured and episodic ways of improvisational learning. Their systematization is based on a two-dimensional framework determined by the formal vs. informal design and acceptance of improvisation and the desired versus undesired variations in organizational routines, outcomes or processes (see Table 1 and the two dimensions in Figure 1). Resistive improvisations occur in terms of informal actions that are regarded as undesired deviation from established processes. Improvisations are rather spontaneous responses to extraordinary and unpredictable events. Subversive improvisations are informal, but are treated as positive and are tolerated if conducted with the organization’s benefit in mind. Semi-structured improvisations are formalized and framed by the organizational setting to reach a desired variation in processes. Finally, episodic improvisations are characterized by their informality, while being cultivated as desirable responses to organizational problems. Building on this systematization of improvisational forms, Cunha et al. (2014) provide a contextualization with respect to the likely appearance in different forms of organizing [20]. The authors argue that the different types of improvisation are more likely to appear in different organizational settings, such as a high or low orientation towards bureaucracy. Table 1 summarizes the characteristics of the four forms of improvisational learning and the respective context of organizing where they are likely to appear.

<table>
<thead>
<tr>
<th>Forms</th>
<th>Characteristics of improvisation and their likely appearance in related organizational contexts</th>
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<tbody>
<tr>
<td>1. resistive</td>
<td>likely in organizations with coercive bureaucracies</td>
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<tr>
<td></td>
<td>strong pressure for and through bureaucratic regulation where deviations are not welcome</td>
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<td></td>
<td>improvisations are being pushed into the organizations’ underlife</td>
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<td>2. subversive</td>
<td>likely in organizations with bureaucracies that show some enabling components</td>
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<td></td>
<td>individuals or small teams of improvisers may initiate spontaneous subversive improvisations</td>
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<td>improvisations are often clandestine</td>
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<td></td>
<td>disequilibrating and unbalancing what is habitually over-structured and taken-for-granted</td>
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<td>3. semi-</td>
<td>likely in organizations that accommodate regular flows of change as an operational requirement</td>
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<tr>
<td>structured</td>
<td>improvisation managed via organizational design (guided forms + structural framing)</td>
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<td></td>
<td>structural frames result from partly improvised learning</td>
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<td></td>
<td>improvisation refers to the ongoing and distributed alignment of emergent activities with organizational core objectives through straightforward guidelines</td>
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<td></td>
<td>paradoxical combination of orientation and permission</td>
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<td></td>
<td>space for separated units to develop tailored solutions to unique problems in the context of shared strategic orientation</td>
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<tr>
<td>4. episodic</td>
<td>potentially in organizations that stimulate an appreciation of spontaneity and proactivity</td>
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<td></td>
<td>creative and spontaneous behavior responding to unexpected events</td>
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<td></td>
<td>creation of ad hoc responses in specific circumstances</td>
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<td></td>
<td>representing a temporal convergence of planning and execution</td>
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<td>necessary when environments are hypercompetitive</td>
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Regarding the context of organizing and the literature about PSS and servitization, this systematization of improvisational learning is applicable as a coping mechanism for the dynamic interplay between production and service.

3. PSS-related form of improvisational learning

As argued in PSS and the related servitization literature, PSS-oriented organizations are crucially dependent on the
adaptability and reorganization of behavioral routines in the force field of two traditionally contradicted paradigms and logics [6,7,13,29]. In PSS, for example, the tension of efficiency (product) versus effectiveness (service) has traditionally been considered as an either-or decision, but has to be preserved as a duality [9,12]. As Neely et al. (2011) put it; the typical characteristics of the product-dominated logic do not vanish in PSS, but contribute to the service effectiveness [9, see also 13]. Biloslavo, Bagnoli, and Figelj (2013) mention certain dualities with regard to the organizational structure and the organizational behavior in a product-service duality: These are centralization and decentralization, function-orientation and process-orientation, as well as standardization and mutual adjustment [12, p. 426].

The emerging contradictions between production and service can also be determined by the specific characteristics of services as a counterpart to production. These are, for instance, the services’ intangibility, coproduction orientation with customers, simultaneity, heterogeneity and perishability. This PSS-specific field of tensions should be framed by empowering organizational design principles and sensemaking leadership styles [30] to support improvisational learning processes at the individual level [see also 31]. This follows the argumentation that potential outcome and benefits of individual improvisational learning processes for an organization are constituted by the syntheses of control and freedom of the organizational context [32]. Hence, the foundation of improvisational learning under the purpose of organizational renewal is seen at the level of the individual actors and the coping strategies they apply [see e.g. 33]. In a PSS-related context of organizing, this synthesis between individual improvisational activities and framing constitutions can be defined as a multilevel tension determined by the duality of production and service routines and the demand for their constructive coexistence traced back to the nature of PSS. This PSS-specific duality raises a high demand for communication and coordination activities between production, service and the customer. It can be argued that the highly individualized customer demand raises further need for a mutual adjustment of product elements and services and, thus, requires rather collaborative improvisational learning routines [16]. The latter are grounded on equal contributions from the opposing parties involved and on the existence of shared mental models [34] while the activities of individuals are coming together [35]. Thus, collaborative improvisational learning capabilities can make intersubjectivity in PSS more fruitful and, thus, unfold the basis for a constructive coexistence of the traditionally rather contradictory logics of production and service. Recent empirical research with regard to individual capabilities in PSS in contrast to production also supports this line of argumentation. Süße et al. (2013) revealed that there is a likely coexistence of efficient experience-based learning routines and innovative-oriented open source learning routines in PSS compared to production [36].

Under the lens of improvisational learning, these findings are in line with Miner et al. (2001), who state that improvisation not only builds on the outcome of prior learning, but triggers both: exploitation-oriented short-term learning and explorative-oriented long-term learning processes [37, p. 306]. The set of items introduced by Süße et al. (2013) for PSS-oriented organizations further characterize a specific form of improvisational learning [36]. This item set consists of the following behavioral patterns:

1. Individuals in PSS find it easier to discuss problems and challenges with people outside of the organization.
2. During daily work, individuals in PSS often communicate with people who are not employed at the same organization.
3. The teams in PSS are less good at using experiences of other groups for their own projects.
4. The management in PSS inspires employees to solve problems and to cope with challenges in new ways.
5. Individuals in PSS usually try to learn from other people during daily work.

As individual behavioral patterns of actions, the five items also provide further insights about organizational design principles. Especially item four, which refers to an inspiring management or leadership that motivates individuals to adapt new ways for solutions, can be regarded as a principle of organizing that elaborates on the variation of outcomes. This characteristic frames the episodic and semi-structured forms of improvising (see Table 1). The items 1 and 2 show a clear orientation towards externally oriented communication, which is less challenging and fruitful in terms of sharing opinions and expectations with other individuals from potentially different backgrounds for coping with new challenges. The characterization represented by item 3 reflects the high dynamics in PSS, which lead to the fact that experiences might already be obsolete or too consolidated and pre-adjusted for use in one’s own projects. Furthermore, it reflects the high degree of customer-specific individualization and a service-oriented logic of fuzziness where it is hard for others to reuse outcome as well as hard to imitate. Miner et al. (2001) found that improvisation is a distinct type of learning determined by “real-time, short-term learning” (37, p. 304). This is especially reflected by the fourth and fifth, as well as the second item above. Building on this empirical knowledge and the PSS-related state-of-the-art literature that further emphasizes the paradoxical tensions, it can be argued that a semi-structured form of improvisation in PSS with a tendency towards episodic improvisation is more likely to appear in comparison to the other forms of resistive, subversive or rather pure episodic improvisation. While the form of resistive improvisation in traditional product-oriented organizations is supposed to appear more likely [20,38], improvisation in PSS seems to be more desired by organizational design principle and is cultivated by the management [see also 10,30]. Furthermore, it can be argued that the subversive form of improvisation is supposed to be more likely during the early transformation process from production or manufacturing towards PSS as it is a form of improvisational learning that is likely to appear in the change or transformation processes of organizations, such as the servitization of production. Figure 1 summarizes this argumentation and illustrates PSS as a semi-structured episodic-oriented form of improvisational learning in contrast to production-oriented contexts of organizing. It is more likely that a rather resistive form of improvisational
As outlined in Figure 1, the dominant form of improvisational learning during the servitization of manufacturing is likely to change from a rather resistive form towards a semi-structured form including episodic elements. Thus, under the lens of the dimensions of improvisational learning as a coping strategy for the interplay of production and service, a transformation of organizational design principles as desirable and a rather formalized framing of improvisational actions in line with the development of collaborative improvisational learning capabilities among individual actors should be of crucial concern for a learning method to equip individuals with capabilities for improvising in PSS. Thus, the learning objectives are twofold: Firstly, learners should understand the dynamics of a dualistic context of organizing like PSS, including the challenges, but especially the opportunities of the interplay between production and service as coexisting poles which can be balanced by patterns of improvisational actions. Secondly, learners should acquire the capabilities to cope with the dynamics of collaborative improvisational learning processes in PSS. In order to meet these learning objectives, the method of business gaming, which has recently been applied to the context of PSS and servitization, is considered as an appropriate method where learners acquire capabilities through reflection-in-action, in reality analogous, but virtual settings [39,40]. A business game represents a model of the relevant dynamics and principles of an organization within a computer-based simulation framework. Learners can act in this virtual environment without the risk of negative consequences compared to real business situations, and learn from experiences and feedback during the business game [41].

In contrast to rather traditional frontal training and development approaches, this game-oriented environment can be seen as more appropriate to support the development of a new understanding among individuals about the desired and valuable outcomes of improvisation in PSS. Therefore, individual learners in the business game interact in groups to perform collaborative actions. The basic entrance setting of the virtual environment is determined by the characteristics of a rather traditional manufacturer that has to be transformed, level-by-level, along the servitization process towards a PSS offering. Tasks for the learning groups are related to the contradictions between production and service along this transformation process [39]. The “overall mission” within the business game is to meet the customer-specific demands that occur during the course of the game through the intense interplay of production and service routines. The customer, as a central design element, is modeled as the dominant agent that dynamically creates the demand for improvisational learning activities among the groups of learners. This game model enriches the PSS-related game design introduced by Sülle and Wilken (2014), which had its shortcomings in the rather low importance of the customer as a dynamic driver for organizational renewal of the PSS provider [39]. The different levels of the business game are framed by the servitization continuum [2] introduced by Oliva and Kallenberg (2003), and the framework by Martinez et al. (2010), which later puts an even stronger focus on the customer integration [3]. During the business game, the learning outcome of participating individuals and groups is evaluated by collecting empirical data about the changes in the behavioral patterns of actions [36,39] along the simulated servitization process from a manufacturer towards a PSS provider. Thus, the development of improvisational learning can be further evaluated and accompanied for servitization through this laboratory context.

5. Closing remarks

The dualistic coexistence of production and service routines of organizing as a prerequisite for PSS determines the organizational design principle that is reshaped during the servitization of manufacturing. This newly emerging dualistic design of PSS creates new demands for individual actors, as improvisation is no longer considered as a rather undesirable phenomenon, but as a desired and designed sustaining organizational principle in dynamic environments. More precisely, the semi-structured form of improvisational learning revealed by the conceptualization of this paper can be considered as a mediating force for the mutual adjustment of production and service to offer customer-specific solutions. This puts improvisational actions as a coping mechanism into the center of a dynamic PSS triangle framed by production, service and customer [42]. Individual actions that can be regarded as enablers for improvisation have been specified as a balancing mechanism of experience-based short-term and explorative long-term-oriented learning activities. These activities demand an understanding and fundamental mind shift among individuals for coping within contexts such as PSS, where an increasing degree of situations are not predictable or determinable in advance. In these contexts, individuals have to build their capability for improvisation to plan and act in a synchronic way. To support this capability-building process, an existing business game scenario has been extended by the aspect of improvisation as a crucial learning objective driven by fluid customer demands. In summary, this paper contributes to the scientific community by a first conceptualization of improvisation and improvisational learning as an enabling force for the servitization of manufacturing and the customer-oriented operation of PSS offerings. Furthermore, it extents the understanding of PSS as
a customer-oriented way of organizing [42]. Thus, it seems promising for future research to gain further knowledge about the concept of improvisation as a crucial enabler for the servitization of manufacturing and the operation of PSS. Therefore, the business game scenario designed can be the basis of PSS-related laboratory research as well as a training tool for practitioners.

References