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DOI
10.1111/jpim.12459
Publication date
2018
Document Version
Final published version
Published in
Journal of Product Innovation Management
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J PROD INNOV MANAG 2018;35(5):682–700

DOI: 10.1111/jpim.12459

The Moderating Role of Tangibility in Synchronous Innovation in Services*

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A synchronous pattern of innovation as between technological and management innovation, for example, can help firms improve their performance. This article explores this idea with respect to servitizing companies that introduce service delivery innovation as a means of gaining competitive advantage. It finds that the degree of tangibility, an indicator of the firm's position on the product–service continuum, affects whether and how managers recognize the need for management innovation when introducing service delivery innovation. Using a socio-technical perspective in conjunction with insights from managerial cognition, the relationship between management innovation and two central types of service delivery innovation—technological and customer interface—is examined. Tangibility shapes the managerial cognitive structures that are related to the enterprise's technical and social subsystems in a paradigm that is capable of demonstrating contrasting effects. Technological delivery innovation is related to management innovation in firms with high tangibility. Customer interface delivery innovation, on the other hand, relates to management innovation in firms with low tangibility. This study uses a sample of diverse firms with varying degrees of tangibility to provide support for this theory.

Practitioner Points

- Servitization requires coordinated innovation efforts on multiple terrains: service delivery innovation needs to be complemented with management innovation.
- Managers need to take cognizance of how a dominant mind set shaped by the level of tangibility can affect their innovation decisions.
- When tangible products are prevalent in a firm's offerings, it is easy to forget that customer interface delivery innovations can be an appreciable source of value creation. Extra effort is needed to re-establish the link with management innovation.
- In firms with few tangible elements in their offerings, it is technological delivery innovation that requires additional anchoring to management innovation. This can be accomplished by, for example, scaling efficiencies gained through new technologies or by adapting the organizational structures and processes.

Introduction

In seeking to gain a competitive advantage through innovation, "servitizing" companies tend to experience an initial decline in profits, even though the principal motive behind the adding of services to organizational offerings is increased profitability—thus, creating an apparent "servitization paradox" (Fang, Palmatier, and Steenkamp, 2008; Suarez, Cusumano, and Kahl, 2013; Visnjic, Wiengarten, and Neely, 2016). A failure to adapt the organization through appropriate management structures, processes, and practices that match the innovated offerings is often at the core of this paradox (Neely, 2008; Schneider, Ehrhart, Mayer, Saltz, and Niles-Jolly, 2005). Such adaptive actions, when pursued by organizations, are captured by the term "management innovation"—sometimes described in the literature as "administrative, organizational, and managerial innovation" (Birkinshaw, Hamel, and Mol, 2008; Damanpour, 2014). Managers who fail to recognize the need to act as change agents in respect of management innovation (Vaccaro, Jansen, Van den Bosch, and Volberda, 2012) may compromise

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*The authors would like to thank seminar participants at Radboud University Nijmegen, Tilburg University, and Vrije Universiteit Amsterdam for their helpful feedback on earlier drafts of this article. We are also grateful to the special issue editors and two anonymous reviewers for their useful suggestions and comments. This research has benefited from the project "United We Stand—Open Service Innovation in the Amsterdam and Utrecht Region" funded by the Dutch Ministry of Economic Affairs and the Provincial and City Governments of Utrecht and Amsterdam.

their organization's capacity to adapt, causing delay or even failure: an area of research that has received very little attention from scholars.

The focus of this research is placed on servitization actions that entail service delivery innovation. Service delivery innovation involves novel mechanisms of delivery that create value for the customer and improve a firm's competitive position (Chen et al., 2009). There are often very limited options to change the core of the service, which carries the main functional benefits for the customer—for example, repair, accommodation, and transportation (Storey and Easingwood, 1998). Innovating the service delivery mechanism, therefore, commands the focus of attention of managers (Chen et al., 2009; Ramdas, Teisberg, and Tucker, 2012; Storey and Easingwood, 1998; Storey, Cankurtaran, Papastathopoulou, and Hultink, 2016). Service delivery is the process of applying specialized competences (knowledge and skills) to provide a service to the customer (Chen et al., 2009; Den Hertog, 2000; Gallouj and Weinstein, 1997; Vargo and Lusch, 2004). Customers are likely to choose features of service delivery that match their needs, allowing service providers to differentiate their offerings and formulate delivery-based strategies that are more difficult to imitate (Berry, Shankar, Parish, Cadwallader, and Dotzel, 2006). Investment in enhanced service delivery can also generate cost advantages for the providers as well as convenience and other efficiency benefits (Schneider and Bowen, 1995).

The patterns of correspondence between service delivery innovation and management innovation remain unexplored in the existing literature. To understand why some firms may fail to introduce management innovation when revolutionizing their service delivery, this study draws on the perspective of organizations as socio-technical systems (e.g., Damanpour, 2014; Hervas-Oliver and Sempere-Ripoll, 2015) and differentiates between two types of service delivery innovation: technological delivery innovation and customer interface delivery innovation. It is then possible to contrast the underlying mechanisms in the relationship with management innovation, especially given the variation in the initial conditions of servitizing firms. The moderating role of tangibility as a critical feature of these initial conditions forms a central part of this investigation. Tangibility reflects the position of the firm on the product–service continuum (Vandermerwe and Rada, 1989; Visnjic Kastalli and Van Looy, 2013): previous literature has shown that it can shape managerial perception and frame the decision-making of organizational stakeholders (Mayer, Ehrhart, and Schneider, 2009; Miller and Foust, 2003). A premise of this research is that understanding the differences among firms in how and what they choose to innovate can bring scholars closer to a more complete understanding of servitization and firm adaptation in the context of services.

This article contributes to the literature in at least three important ways. First, the research on the relatedness of innovation types is taken a step further (Damanpour, Walker, and Avellaneda, 2009; Keupp, Palmié, and Gassmann, 2012). This study shows that this relatedness in the context of services should consider innovation in two distinctive but critical delivery types: technological and customer interface. It is shown that these types prompt managers to take different

BIOGRAPHICAL SKETCHES

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Dr. Pim den Hertog earned his PhD on the basis of a thesis entitled "Managing Service Innovation" from the University of Amsterdam. He developed the six-dimensional service innovation model as well as a dynamic service innovation capabilities model for managing and analyzing the service innovation process. He is one of the founding partners at Dialogic, a research-based consultancy in Utrecht, the Netherlands. He has participated in and led numerous national and international studies on innovation policies, innovation governance and service innovation (policies), and has monitored and evaluated studies of individual innovation instruments and organizations. His work on managing service innovation has appeared in *International Journal of Innovation Management, Journal of Service Management, The Service Industries Journal*, and various other academic journals.

actions as they proceed to embed delivery innovation in their organization. In demonstrating that this relatedness is contingent on initial conditions indicated by the degree of tangibility, this current study augments the research literature's potential to provide a more complex understanding of the underlying patterns of innovation relatedness. Second, a managerial cognition perspective is introduced into the socio-technical systems approach to studying innovation relatedness (Damanpour et al., 2009). An explicit theory is constructed on how innovation types are linked through a pattern of decisions made by managers, who are cognitively constrained by their context (Frei, 2008; Van Riel, Lemmink, and Ouwersloot, 2004). This research adds to the growing base of innovation studies from a strategic management perspective (Keupp et al., 2012). Third, an empirical contribution is made by testing the relationships with a novel sample of 126 diverse firms drawn from a developed services-dominated regional economy. Primary data have been collected through a survey of managerial perceptions conducted in two stages. This current research adds to the relatively few innovation studies carried out in service contexts; existing research is dominated by studies of manufacturing and R&D-intensive organizations (Crossan and Apaydin, 2010; Keupp et al., 2012). As more and more firms become concerned with developing a service orientation (Visnjic Kastalli and Van Looy, 2013), studies such as this can shed light on the complex interrelatedness of different innovation types deployed to achieve effective firm adaptation and to gain competitive advantage.

Theory

Social and Technical Subsystems in Services and Innovation Types

In this article, the goal is to understand the intricacies between different innovation activities within organizations in a services context. More broadly, the view of organizations as socio-technical systems is applied to study the correspondence between innovation types (Damanpour, 2014; Hervas-Oliver and Sempere-Ripoll, 2015; Trist and Bamforth, 1951). According to this view, organizations comprise two subsystems—one social and one technical—the former referring to the people who work in the organizations and their relationships, and the latter to the techniques, procedures, and occupational roles comprising the enterprise's production method. Innovation in one subsystem requires corresponding innovation in the other in order to sustain or enhance performance (Trist and Bamforth, 1951; Trist and Murray, 1993). Research on such patterns of synchronous innovation within organizations has increased in the recent past, surpassing the more traditional evolutionary and sequential models of innovation emergence (e.g., Abernathy and Utterback, 1978). The focus of such studies has moved from technological product and process innovation to incorporate non-technological innovation types such as management innovation, but such studies remain scarce (Damanpour, 2014; Damanpour et al., 2009).

Management innovation is defined as a new practice, process, or structure that changes the content or nature of managerial work (Birkinshaw et al., 2008). This can involve, for example, changes in the tasks and responsibilities of specific functions, in separation or integration of organizational units, and in compensation and other employee management policies. Birkinshaw et al. (2008) theorized that management innovation can be generated through the problem-solving search behavior of internal change agents such as managers and employee movements that initiate such innovations (Vaccaro et al., 2012). Problem-solving behavior can be triggered by a discrepancy between the current level of competences and the desired or potential level, and by the need for a response to environmental changes and opportunities. The interdependencies among organizational subsystems can, therefore, drive the need for management innovation. Prior research has shown that technological and management innovations are correlated with and persistent within highly innovative firms (Battisti and Stoneman, 2010). Research has also distinguished between technological product and technological process innovation (Evangelista and Vezzani, 2010; Hervas-Oliver, Sempere-Ripoll, and Boronat-Moll, 2014), with the evidence pointing to a positive relationship between technological process innovation and management innovation (Hervas-Oliver and Sempere-Ripoll, 2015; Hollen, Van Den Bosch, and Volberda, 2013). The socio-technical systems perspective explains the correspondence between the two types of innovation centered on the need to harmonize the technical and the social subsystems of organizations (Trist and Bamforth, 1951; Trist and Murray, 1993), with technological innovation representing changes in the technical

subsystem and management innovation, changes in the social subsystem.

Social subsystems in services and service delivery are further differentiated into managerial and customer interface subsystems (Bowen and Ford, 2002; Schneider et al., 2005). The latter involves the customer interface that connects the organizational technical core with the external environment and includes the orchestration of customer involvement in the co-production of the service experience. Direct involvement on the part of customers contributes to the quality of the outcome pursued (Lengnick-Hall, 1996). The social subsystem of the customer interface is different from the managerial social subsystem, which is directed to the company's own employees. At the customer interface, it is often the frontline employees who are the carriers of the practices and techniques required for this subsystem to function properly. Customers are "quasi-employees" (Lengnick-Hall, 1996), and firms often require separate strategies to manage customer interfaces (Frei, 2008). Customers "intrude" in the technical core of the firm but the company has no hierarchical influence or control mechanisms over them, unlike its own employees (Mills and Morris, 1986). Innovations specifically targeted to improving the customer interface can contribute to a unique customer experience and, thus, allow the firm to differentiate itself successfully (Dasu and Chase, 2010). Accordingly, service delivery innovation—which concerns the mechanisms of service delivery that are deployed to create value and improve a firm's competitive position (Chen et al., 2009)—can be directed to either the technological subsystem or the customer interface subsystem, or to both.

Tangibility

Another important distinction in services is the variation in their degree of tangibility, which is represented by their position on the product–service continuum (Vandermerwe and Rada, 1989). Some services are offered as bundles with physical products—for example, the maintenance and repair of construction equipment. Other firms specialize in offering standalone services, such as legal/tax advisory and interior design. This blending of product and service is captured by the concept of tangibility and manifests itself to different degrees in different organizations. The degree of tangibility in an organization refers to the degree of presence of a tangible product in the offering, and it determines the position of the firm on the product–service continuum. All offerings are "bundles" of both tangible and intangible elements but the proportion varies (Shostack, 1977). Tangibility is the degree to which the tangible elements—i.e., whether services are attached to the physical products—dominate the offering (Mayer et al., 2009). Offerings high in tangibility can be assessed through the basic senses of touch and taste. Among services, the degree of tangibility can vary considerably. For example, consulting advice and teaching are highly intangible, whereas a supermarket purchase is highly tangible. In manufacturing-firm offerings, service components such as maintenance, warranty, and technical support are typically included. Depending on the degree to which services are prevalent in the overall offering, such firms can be classified as either tangible or intangible.

The degree of tangibility is an important contingency in how organizational actors perceive and enact their organizational subsystems (Mayer et al., 2009). The tangibility context shapes the perception and cognition of both customers and employees (Miller and Foust, 2003). In particular, it affects the cognitive structures of managers concerning the cause–effect relationships between decisions within the organization and the impact of such decisions on existing systems and structures (Gary and Wood, 2011; Walsh, 1995). In this article, it is argued that tangibility affects the focus of managerial attention on whether to emphasize the technical subsystem or the customer interface subsystem when contemplating innovation. As managers reflect on which competences need to be developed as the organization implements innovation in its delivery subsystems, their search tends to favor the dominant delivery subsystem. Tangibility can, therefore, act as a factor either limiting or enhancing the correspondence between service delivery innovation and management innovation.

Hypotheses

Technological Delivery Innovation and Management Innovation

The baseline hypothesis of this study follows previous research on the correspondence between technological and management innovation (Battisti and Stoneman, 2010; Evangelista and Vezzani, 2010;

Hervas-Oliver and Sempere-Ripoll, 2015; Hervas-Oliver et al., 2014). Organizations that are able to innovate by sensing and absorbing new technologies can benefit from facilitated collaboration, increased efficiency, and flexible monitoring throughout the service–production process (Van Riel et al., 2004). In this article, "technological delivery innovation" is defined as innovation resulting from the adoption and use of new technologies in the technical subsystem of organizations. For service firms, much of this type of innovation is reported in the literature as "supplier dominated"; that is to say, new technology development is assumed to take place outside the organization and in specialized technology–supplier companies (Miozzo and Soete, 2001). Apart from the supplier companies that develop new technological solutions, consulting firms and university technology transfer offices (TTOs) play important roles in advising and supporting organizations in integrating technology-based innovation into their existing technical subsystems (Castellacci, 2008). Ultimately, managers deploy externally available or internally developed technologies to alter the techniques and procedures used in the service production process and, by so doing, generate technological delivery innovation. Critical to this transition is the development of unique, company-specific competences. Implementing new technologies in the organization brings about specific changes in the technical subsystems. For example, attorneys can start to use a proprietary database with legal information in preparing and conducting a court hearing, thereby reducing preparation time and boosting the effective handling of a legal case.

Adopting new technologies modifies the configuration of tasks and skills of individuals involved in the technical subsystem, and this subsequently affects the relational aspects of work roles due to the interdependency of tasks (Barley, 1990). The consequences of this relatedness may include the weakening of existing boundaries, the differentiation of hierarchical statuses, and adjustments in the interdepartmental interactions (Burkhardt and Brass, 1990). Such structural reconfigurations will likely pose demands for the reshaping of the patterns of management practices and processes (Trist and Murray, 1993). However, this transition is not automatic but contingent on the attention given to it by managers. Managers who do recognize the existence of capability gaps between their organization's current management competences and those required by the new technologies will undertake adaptation initiatives (Lavie, 2006). Froehle (2006), for instance, found that the courtesy, professionalism, and attentiveness of customer service personnel were not as relevant in achieving customer satisfaction in technology-mediated service contexts as in traditional service delivery. It is for this reason that, in order to ensure adaptation and to address capability gaps, managers are likely to establish new structures, processes, and practices, as well as modify existing ones (Edmondson, Bohmer, and Pisano, 2001; Orlikowski, 1992).

In addition to recognizing capability gaps that can engender a top-down management response, technological innovation allows organizational members to improvise and enact new structures in their work practices as they interact with the new technologies (Orlikowski, 2000) in a more natural process of adaptation from the bottom up. Technological change is often initiated by groups within the organization with strong advocacy for—and relatively high competence in—the new technology. Social information-processing mechanisms regulate the transmission of attitudes to the technology (Rice and Aydin, 1991), and this transmission enables people to experiment with variation in their work distributions, types of collaboration, and ways of learning (Orlikowski, 2000). Such experimentation within the technical subsystem can eventually lead to new organizational competences in the managerial social subsystem, thus engendering management innovation.

In sum, innovation that originates as a change in the constraints and possibilities a given new technology offers to the existing technical subsystems of firms can lead to change in the processes, practices, and structures of organizational management. In line with the theory and the evidence of previous research, it is argued that technological delivery innovation is positively related to management innovation—and no less in service contexts. The baseline hypothesis, replicating previous research, is therefore:

H1: Technological delivery innovation is positively related to management innovation.

Customer Interface Delivery Innovation and Management Innovation

While technological innovation has been widely studied in both the services and manufacturing

sectors (Sirilli and Evangelista, 1998), the correspondence of customer interface delivery innovation with management innovation is unique to the services context. The direct involvement of customers in the production process is a distinctive characteristic of services (Bitner, Booms, and Tetreault, 1990; Bowen and Ford, 2002). Customer interface delivery innovation takes place when important changes are made in the customer interface social subsystem. Customer interface innovation initiatives can comprise new combinations of human and physical resources such as redesign of the "servicescape," alterations to the "script" of the customer encounter, and adaptations to the channels used to communicate with customers (Michel, Brown, and Gallan, 2008). Eataly, an international retail company, created a unique Italian dining experience by merging the customer interface subsystems of a grocery store with those of a variety of restaurants. Customer interface delivery innovation can create a competitive advantage for the firm and new value for the customer through lower prices, higher levels of customer self-esteem, shorter waiting times, and higher customization (Schneider and Bowen, 1995). For example, a dry-cleaning establishment can alter its customer interfaces by offering 24-hour accessibility, customization options, and home/business delivery. The technology of the service remains the same, but value is added through novel customer interfaces. Dell, a computer company, held a competitive advantage in the industry during the 1990s through its novel customer interface: a direct-sales model of PC configurations.

For the organization, the advantage of customer interface delivery innovation originates from the reconfiguration of competences and tasks that are shifted onto or expected from customers as a direct consequence of their participation in the customer interface social subsystem (Gallouj and Weinstein, 1997). The changes also affect the tasks and competences of the firm's own employees in the managerial social subsystem. For example, the transfer of service tasks to the customer can make existing functions in the organizational structure obsolete and may require adjustments to organizational structures; this could include introducing new departments, drawing different lines of communication or authority, and developing new areas of responsibility. For example, competence gaps related to the new ways in which customers are to be treated may require different policies on training, rewarding, and motivating the firm's employees. Frontline employees may be most affected. In addition to their service role, their involvement in marketing services may change in response to changes in the customer interface (Gronroos, 1990). Such managerial subsystem changes raise the stakes for management innovation.

As the elements and linkages in the customer interface subsystem change, the organization may need new practices and policies for managing the customers as "quasi-employees" (Lengnick-Hall, 1996). This means that the company needs to be aware not only of the specific task requirements but also the motivations and skills of the customers (Mills and Morris, 1986). The specific management policies and strategies directed at customers are different from those for employees; an encounter with a customer is shorter with limited scope for training or socialization. Indeed, customers may be poor resource providers and may not be able to articulate their needs clearly. Nonetheless, failure to adapt management practices and policies can result in an increased rate of service failures (Mills and Morris, 1986), forcing managers to then consider management innovation as a remedial action. Here, there is an obvious correspondence between the two social subsystems in relation to innovation, independent of the correspondence between technological delivery innovation and management innovation.

H2: Customer interface delivery innovation is positively related to management innovation.

The Moderating Role of Tangibility

Tangibility reduces the risk and uncertainty for the customer in evaluating the quality of the offering (Miller and Foust, 2003). In the marketing literature, for example, attention has been given to studying the strategies that marketers can employ to increase customers' perceived tangibility. Firms can emphasize the offering's benefits and attributes through tangible cues and symbols in brand names and marketing communications. A logistics company can promote the values of professionalism and punctuality through sharp employee uniforms and corporate identification visualizations that evoke mental imagery congruent with service attributes. Ultimately, the subjective evaluation by customers is decisive in

determining whether the organization is successful in a services context (Bowen and Ford, 2002).

The approach that an organization takes to respond to and manage the perceived risk and uncertainty for customers is reflected in the perceptions of its managers (Schneider et al., 2005). Managerial cognition associated with the level of tangibility will affect whether and how managers respond to signals from their surroundings—for example, when innovation affects delivery subsystems. In other words, the correspondence with management innovation will be contingent on whether managers possess appropriate cognitive structures that allow them to discern modifications in the technical and customer interface subsystems. Cognitive structures are models of cause–effect relationships in the minds of decision makers (Walsh, 1995). An accurate representation of the socio-technical organizational system allows managers to introduce adequate adaptation strategies to improve organizational performance (Gary and Wood, 2011). In a services context, recognizing changes in service delivery subsystems and engendering management innovation allows the firm to compete more effectively in the marketplace (Cusumano, Kahl, and Suarez, 2015; Visnjic Kastalli and Van Looy, 2013). The theory presented in this article suggests that managers are able to enact this link if their firm's position on the tangibility scale has established cognitive structures that are relevant to them.

When technological-subsystem changes take place in a tangible context, the mechanisms discussed in H1 are activated. The presence of physical evidence makes the configuration of tasks and activities more clear cut: managers are more likely to agree on evident disturbances in the processes when new technologies are implemented. The competency gaps in employee skills also become more obvious. The amount and quality of information available about the tasks to be accomplished and the standards that characterize product quality make it almost inevitable that managers come to understand the need to adapt the managerial subsystem as well. The possibility to experiment and introduce greater variation into the structures and internal collaborations (Orlikowski, 2000) is also facilitated. Such experimentation is less risky and more justifiable when it involves tangible elements: organizational members can work toward more visible and predictable outcomes.

This is less often the case in intangible settings. Although technological delivery innovation may affect the relational aspects of the work being done, managers are less likely to recognize the need to introduce management innovation given that relevant cognitive structures are missing. Even if they sense disturbances in the delivery subsystems, managers may disregard the need for management innovation if tangible anchors on which to base the discussion are less in evidence. The skills required to obtain critical customer outcomes—such as attention to customer needs and courtesy—may be less affected by the introduction of innovation based on technology (Schneider et al., 2005). Technologies that facilitate the application of knowledge and skill may make the processes more efficient but may not require change in management processes and structures. Experimentation will be also limited if the outcomes are more uncertain and greater risks are involved. Managers may need to develop defensible turf to justify their case before they demand management innovation (Anand, Gardner, and Morris, 2007). This is much more difficult if the cognitive structures that clarify and justify the correspondence between the technical and managerial social subsystems are not readily available.

H3a: Tangibility positively moderates the relationship between technological delivery innovation and management innovation: at higher levels of tangibility, the positive relationship will strengthen.

Customer interface delivery innovation, on the other hand, will relate to management innovation in intangible settings. It is in such settings that the mismatch between the demands triggered by changes in the customer interface subsystem and the available managerial subsystem becomes salient. The lack of physical evidence is not a limiting factor since managers already pay attention to the patterns of interaction activity in the organization. Strategies for overcoming the complexity and uncertainty surrounding lack of tangibility are already in place. For example, managers in such organizations often use management tools such as customer journey visualizations and "service blueprints" (Bitner, Ostrom, and Morgan, 2008). Such tools allow managers to create more concrete representations of abstract and intangible service characteristics and delivery subsystems. Other strategies for making the intangible more "tangible" include the use of associative symbols in brand names and logos, which convey certain service benefits. The image of a

rock can be used to represent solid financial advice, for example. Dramatization can be employed to emphasize the value creation process for customers. A shop selling tailor-made suits may put a couturier, crafting a garment, on display in its shop window. Such strategies are often discussed and aligned across different organizational levels, ensuring there is awareness and established cognitive structures in the decision makers' minds (Miller and Foust, 2003).

In tangible settings, the technical subsystem is much more salient, and the customer interface subsystem features less prominently in managerial cognitive structures. Introducing customer interface innovation would consequently have a much weaker correspondence with management innovation (Lengnick-Hall, 1996). Managers are less likely to recognize the need for it in service delivery innovation. They may also deem that customer interface changes do not affect the critical elements of the technical subsystem, and so they are less willing to initiate management innovation. Even though investment in customer–interface–system redesign can have a major impact on the value created for the customer and on the competitive advantage of the firm, managers are likely to remain unwilling to introduce appropriate management innovation due to their preoccupation with the physical production system. This can thwart the adaptation process in their organizations (Amburgey and Dacin, 1994). Nokia, for example, failed to adapt its managerial subsystem to give greater prominence to the app store as a key customer interface for selling mobile software: instead, it continued to prioritize improvement in its technical subsystems in the interests of technological innovation—to the company's detriment (Vuori and Huy, 2016).

H3b: Tangibility negatively moderates the relationship between customer interface delivery innovation and management innovation: at higher levels of tangibility, the positive relationship will weaken.

Method

Data and Sample

The data set for this study covers 126 firms and was obtained by combining multiple sources. The first was a survey that took place in 2011, collected with the purpose of informing policymakers about the innovativeness of local enterprises commissioned by the Ministry of Economic Affairs, and the local and provincial governments of two central Dutch regions. The survey contained responses from the CEO or other senior executives in 407 organizations with more than 10 full-time employees. The cut-off point was chosen deliberately to exclude micro-enterprises, which are officially defined as businesses with less than 10 employees. This study focuses on enterprises with more than 10 employees since this includes SMEs and larger organizations that engage in important innovation activities, particularly in non-technological domains (e.g., Hervas-Oliver, Ripoll-Sempere, and Moll, 2016). Many service sectors are dominated by smaller firms and excluding them would introduce bias into our findings. The survey was sent to 7000 firms identified through a systematic sampling technique from a comprehensive list of enterprises from the two regions that fit the selection criteria. The list was obtained from Orbis (Bureau van Dijk), a specialized database that includes all registered firms in the region. The sample covered all available economic sectors and excluded public and governmental institutions. The survey data offered ample variation of the studied variables. The measures for the variables "technological delivery innovation," "customer interface delivery innovation," "tangibility," "past performance," and "industry competitiveness" are obtained from this source.

The second source was data collected from a survey carried out in 2012. In that survey, a sample of the organizations that were part of the first data set was taken. This time, for each organization, the name of an executive other than the one who had participated in the 2011 survey was obtained. The executive was asked to fill out a web-based questionnaire accompanied by a cover e-mail explaining the purpose of the survey and guaranteeing confidentiality. The possibility of a report summarizing results with a benchmarking option was also offered. Follow-up phone calls were made in an attempt to increase the response rate. Completed surveys from 126 organizations were obtained, giving an effective participation rate of 31% of the original sample. Of the responding firms, 37% were in the business and financial services industries, 18% in transport and trade, 13% in the information and communication technologies industry, 9% in the construction industry, 9% in the

manufacturing and utilities industries, and 14% from other services industries. The tests for nonresponse bias showed no significant differences in firm size and age ($p > .05$). The two respondents from each company (one from the first survey, one from the second) did not, on average, differ significantly in terms of their position within the firm, their working experience, their tenure in the current position, gender, and education ($p > .05$). The measures for the variables "management innovation," "innovation leadership," and "executive tenure" are obtained from this source.

The third data source was a database of company information, Orbis, maintained by Bureau van Dijk, an agency that specializes in archiving information from filings from the local chambers of commerce and annual reports. This data source delivered the measures of firm size and firm age.

Measures

Dependent variable. For the dependent variable, "management innovation," it was decided to use a six-item scale developed by Vaccaro et al. (2012), which was included in the 2012 survey. It operationalizes the concept as a firm-level phenomenon and probes changes in firm management practices (items 1 and 2), processes (items 3 and 4), and structures (items 5 and 6). This is closely in line with the definition this study adopted for management innovation as the introduction of new practices, processes, and structures, intended to improve organizational performance. Following other research on management innovation, an operationalization where the changes are "new to the organization" as compared to "new to state-of-the-art" management innovation was chosen (cf. Birkinshaw et al., 2008). This meant that a larger number of organizations could be studied, and a greater variety of management innovation that firms may choose to introduce could be captured. The items in the measurement scale are shown in the Appendix.

Measuring the dependent variable from a respondent other than the one who provided information about the independent variables can alleviate biases stemming from the use of a common rater and a single measurement context for the predictor and the criterion (Podsakoff, MacKenzie, and Podsakoff, 2012). Although the scale was empirically validated previously, given this study's empirical context, reliability and validity tests were nevertheless conducted. An exploratory factor analysis (EFA) produced a one-factor solution with item loadings ranging from .61 to .82, which showed convergent validity. Cronbach's α for this scale was .86. Additionally, the scale was validated against a three-item measure of firm innovation leadership adopted from Gebauer, Gustafsson, and Witell (2011). A confirmatory factor analysis (CFA) of the two scales with each item loading on a respective latent factor showed good fit (χ^2/d.f. = 1.816, confirmatory fit index (CFI) = .956, root mean square error of approximation (RMSEA) = .081). All loadings were significant ($p < .001$) attesting to convergent validity. The correlation between the factors was significant ($p < .05$) but moderate ($r = .22$). Constraining it to one significantly worsened the model's fit (rho = .043), showing the discriminant validity of the scale.

Independent variables. To measure service delivery innovation, we decided to measure on the company level so that different organizations could be compared. As no such measure was available in the literature, new measures were developed based on existing published work and qualitative data collected in the process (Den Hertog, 2000; Gallouj and Weinstein, 1997). First, a pool of items that would capture innovation activities in service contexts mentioned in previous studies was generated. Striving for optimal content validity, the interpretation of the dimensions was made to correspond with the available contributions (Churchill, 1979). From the pool of items, unique items for inclusion in initial scales were selected. Fellow researchers and respondents from different types of company were interviewed, asking them to complete the scales and indicate any ambiguity regarding the phrasing of items. Pretests were used to explore the structures underlying the relationships among specific service innovations. As a result, it was possible to further enhance the phrasing and the selection, striving for economy of explanation and focus. Alternating between theory and data, the final version of the scales was arrived at, measuring the two distinctive service delivery types of innovation: *technological* and *customer interface* (see Appendix). The respondents were asked to rate the extent to which their organization has introduced innovations in the past 3 years by making changes to the two subsystems. Each item was focused on

elements that would reflect the literature and this study's qualitative analyses as closely as possible. For *technological delivery innovation*, two items were used to measure whether technology played an important role in the renewed service production (item 1), and whether new service offerings were developed based on new or different utilization of information and communication technologies (ICTs) (item 2). For *customer interface delivery innovation*, three items were initially developed, but the third item proved ambiguous to respondents and was later eliminated from the scale (see Appendix). The remaining items focused on new channels for communicating with customers (item 1) and new ways of interacting with customers (item 2).

The scales underwent tests for internal consistency and discriminant validity through EFA and a CFA alongside the other multi-item variables in the first survey. A two-factor solution was the result of the EFA with factor loadings for *technological delivery innovation* of .86 and .88. and for *customer interface delivery innovation* of .91 and .92. For internal consistency, Cronbach's alphas, composite reliabilities, and average variance extracted (AVE) measures were examined (Fornell and Larcker, 1981; Nunnally and Bernstein, 1994). Cronbach's α was .76 and .85, respectively. Composite reliability (ρ_c) is obtained by dividing the squared sum of the individual standardized loadings by the sum of the variance of their error terms and the squared sum of the individual standardized loadings (Fornell and Larcker, 1981). The two dimensions scored .76 and .85, respectively. The alpha scores and the composite reliability scores exceeded the common threshold of .70, which indicate strong consistency. AVE (ρ_{ave}) was calculated by dividing the sum of the squared individual standardized loadings by the sum of the variance of their error terms and the squared sum of the individual standardized loadings. This calculation shows how much of the variance is retained in the latent construct, relative to the variance remaining from measurement error. If AVE is higher than .50, it is concluded that a larger portion of the variance is captured by the latent factor (Fornell and Larcker, 1981). Within the two-factor solution that this study found, the AVE was .61 for *technological delivery innovation* and .74 for *customer interface delivery innovation*. The CFA was also used to assess for convergent and discriminant validity. Each item was constrained to load on its respective latent factor. The results showed good fit within the model (χ^2/d.f. = 1.714, CFI = .930, RMSEA = .076). All loadings were significant ($p < .001$), demonstrating the convergent validity of the scales. The factor correlation had a moderate value (.266), and a test was carried out to establish whether this correlation differed significantly from unity. A model was constructed where this correlation was constrained to one and compared with the unconstrained model. The result from the pairwise comparison showed that constraining to unity does not improve the model's fit (rho value .001, $p > .05$), indicating the discriminant validity of the latent variables. As another indication of discriminant validity, the variance between the constructs was compared with the variances shared by the constructs and their respective individual items (the AVE) (Fornell and Larcker, 1981). The correlation between the latent variables was smaller than the square root of AVE from its own items. This shows adequate discriminant validity.

Moderator. Measuring tangibility is not without its challenges (Miller and Foust, 2003). Most existing studies on tangibility, however, measure customer perceptions of services tangibility. But, for the customer, it is a concept they find more difficult to understand. This study takes a management perspective in which tangibility is conceptualized as a feature of the overall profile of an organization's offerings. It was decided to opt for a firm-level measurement that would signify the degree to which the services that the firm offered were attached to physical products. A single-item measure was used, which asked respondents to rate the statement: "Our services are attached to physical products that we are offering" on a seven-point Likert scale. A high score indicates that the organization's offerings were highly tangible (i.e., with a strong product component), while a low score indicates that the organization's offerings were highly intangible (i.e., with a strong service component). The pretests showed that respondents had no difficulty in understanding the measure and correctly rated their organization on this dimension. It should be noted that, in previous literature, single-item measures were commonly used to measure tangibility (e.g., Mayer et al., 2009). The scale was further validated by examining the textual trade

descriptions of the firms as provided by the companies themselves and available in the Orbis database. The trade description was compared with the tangibility score. The two were highly consistent.

Controls. We decided to include measures for *firm size* as the logarithm of the number of full-time employees, and *firm age* as the logarithm of the number of years since establishment since firms may differ in their approaches to management innovation as they accumulate structures and develop further in their life cycle (Vaccaro et al., 2012). *Executive tenure* was also employed to indicate the number of years the respondent has held his/her current position. Executives with a longer tenure in a top position may be less likely to innovate (Crossan and Apaydin, 2010). *Past performance* (α = .88) was measured using a perceptual scale of the organization's performance in the previous year—relative to the competition—based on return on assets, profitability, revenue, and market share (Robinson and Pearce, 1988). Management innovation could also be affected by the level of the firm's *innovation leadership* (α = .83) (Gebauer et al., 2011; Narver, Slater, and MacLachlan, 2004). In addition, we decided to control for executives' perceptions of *industry competitiveness* (α = .80) (Jaworski and Kohli, 1993), in the belief that this may stimulate management innovation actions. The scales for past performance, innovation leadership, and industry competitiveness are listed in the Appendix with their factor loadings.

Analysis and Results

Descriptive statistics and bivariate correlations are listed in Table 1. The hypotheses were tested with linear regression models. The standardized results from the hypotheses tests are listed in Table 2. With management innovation as the dependent variable, Model 1 shows the effect of the control variables. Models 2 and 3 show the independent direct effect of the two domains of innovation and Model 4 shows their combined effect. In the following models, the interaction effects with tangibility are introduced—separately in Models 5 and 6, and together in Model 7.

The required conditions for the ordinary least squares (OLS) regression method were satisfied. Due to significant correlations among the independent variables, multicollinearity was a source of concern. Variance inflation factors (VIFs) were used to judge its presence in the models. The independent variables that were used in the interaction terms were mean-centered (Aiken and West, 1991). Across all models, the highest VIF was 1.61, which is well below the cut-off point of 10 (Neter, Wasserman, and Kutner, 1990). The full model showed an R^2 of 28.17% and lowest Akaike information criterion (AIC) and Bayesian information criterion (BIC) scores. Of the control variables, innovation leadership was positively and significantly related to management innovation ($p < .10$).

H1 stated that technological delivery innovation is positively related to management innovation. A strong positive effect (β = .301, $p < .001$, Model 2) was found, confirming the hypothesis. H2 dealt with

Table 1. Descriptive Statistics and Correlations

		Mean	S.D.	1	2	3	4	5	6	7	8	9
1	Management innovation	4.08	1.22									
2	Technological delivery innovation	5.00	1.67	.32***								
3	Customer interface delivery innovation	4.47	1.48	.24**	.21*							
4	Tangibility	3.46	2.39	–.07	.00	–.02						
5	log(Firm size)	3.63	1.27	.11	.13	.04	–.08					
6	log(Firm age)	2.88	.78	–.15	–.06	–.05	.30***	.07				
7	Executive tenure	10.59	6.89	–.10	.01	.10	.02	–.11	.25**			
8	Past performance	4.29	1.41	.16	.13	.00	.03	.27**	–.02	–.11		
9	Innovation leadership	4.81	1.13	.22*	.00	.07	.07	–.06	–.20*	–.11	.16	
10	Industry competitiveness	5.06	1.24	–.13	–.05	–.01	.19*	–.14	.11	.00	–.10	–.18*

*$p < .05$, **$p < .01$, ***$p < .001$; n = 126.

Table 2. Results of Regression Analyses for Management Innovation

Models	1	2	3	4	5	6	7
Intercept					.000	–.003	–.004
log(Firm size)	.094	.056	.074	.047	.045	.050	.049
log(Firm age)	–.105	–.064	–.075	–.054	–.051	–.074	–.083
Executive tenure	–.032	–.049	–.064	–.070	–.087	–.063	–.081
Past performance	.096	.067	.102	.073	.089	.097	.133
Innovation leadership	.171†	.186*	.158†	.171†	.146†	.171†	.139
Industry competitiveness	–.063	–.050	–.062	–.054	–.083	–.063	–.107
Tangibility		–.050	–.038	–.048	–.034	–.045	–.024
Main effects							
Technological delivery innovation		.301***		.266**	.303***	.285**	.347***
Customer interface delivery innovation			.224*	.169†	.120	.188*	.135
Interactions							
Technological delivery innovation × Tangibility					.207*		.276**
Customer interface delivery innovation × Tangibility						–.132	–.215*
R^2	8.97%	17.82%	13.96%	20.47%	24.21%	22.14%	28.17%
F change	1.95†	6.30**	3.39*	5.59**	5.67*	2.46	6.11**
AIC	360.73	351.84	357.63	349.71	345.64	349.04	340.87
BIC	383.42	380.20	385.99	380.91	379.68	383.08	377.74

†$p < .10$, *$p < .05$, **$p < .01$, ***$p < .001$; $n = 126$.

the relationship of customer interface delivery innovation. The direct relationship was positive and significant ($\beta = .224$, $p < .05$, Model 3), so the hypothesis is also supported. H3a and H3b were supported since the moderating relationship is positive for technological ($\beta = .276$, $p < .01$, Model 7) but negative for customer interface delivery innovation ($\beta = –.215$, $p < .05$, Model 7). Figure 1 plots the interaction relationship at +1 s.d. and –1 s.d. from the means of the interacting terms.

Endogeneity Check

The observed relationships between technological delivery innovation and management innovation, and between customer interface delivery innovation and management innovation may have been due to other unobservable factors. To check for possible endogenous relationships, a Durbin–Wu–Hausman endogeneity test was conducted (Wooldridge, 2010). A suitable instrumental variable is highly correlated with the potentially endogenous constructs (innovation in the two delivery subsystems) but not overly correlated with the dependent variable (management innovation). Environmental dynamism was used as the instrumental variable. In dynamic environments, the rate of delivery innovation accelerates, whereas this does not hold true for management innovation (Eisenhardt and Tabrizi, 1995). Specific organizational structures and practices are associated with the environmental conditions of the firm (Lawrence and Lorsch, 1967), but their adaptation may not be directly associated with the level of dynamism. Therefore, environmental dynamism is a good instrumental variable in our context. A measure for *environmental dynamism* ($\alpha = .85$) was included (Dill, 1958; Jansen, Van den Bosch, and Volberda, 2006) and the Durbin–Wu–Hausman tests were conducted. The tests failed to reject the null hypothesis ($p > .05$), showing that endogeneity is not a concern in this study.

Discussion

In this study, the authors sought to understand the efforts undertaken by servitizing firms investing in service delivery innovation and how these relate to management innovation. Research on the correspondence among different innovation types is still in its infancy (Crossan and Apaydin, 2010; Damanpour, 2014; Damanpour et al., 2009) and studies have been typically confined to manufacturing firms, while the services context has been neglected (Evangelista and Vezzani, 2010). Innovation is, of course, important for the survival of organizations, and previous studies

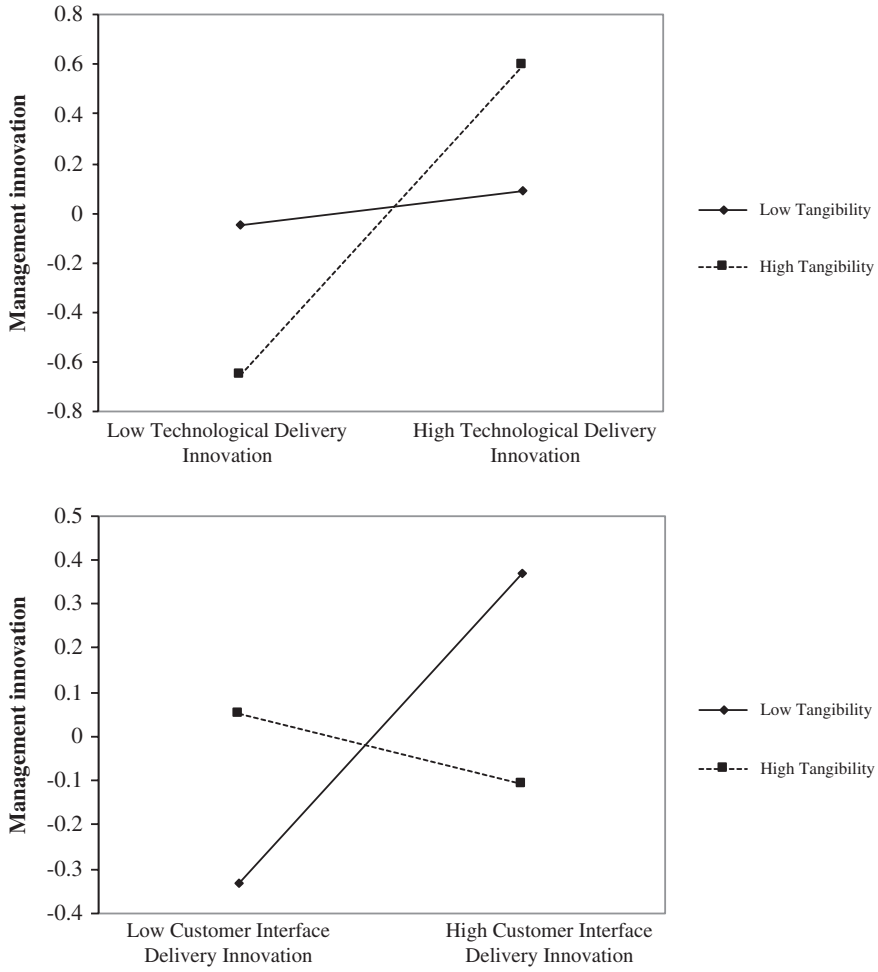

Figure 1. Plotted Interaction Effects (Standardized Values)

have shown that a combination of technological and management innovation can improve organizational effectiveness and performance (e.g., Damanpour et al., 2009; Hervas-Oliver et al., 2014). This study shows that, in services, the correspondence is not uniform and that the unique characteristics of services need to be taken into account. Specifically, this research effort extends the perspective of organizations as socio-technical systems and puts forward technological delivery innovation and customer interface delivery innovation as two distinctive innovation options aimed at securing competitive advantage. Using insights from the research literature, hypotheses were developed concerning the relatedness of these two forms to management innovation (H1 and H2), and the moderating role of tangibility in this relationship (H3a and H3b).

The hypotheses on direct correspondence were supported. In this sample of a diverse set of firms, the strongest evidence was found for delivery innovation based on new technologies. The supply of new technologies is ubiquitous and has impacted businesses across the spectrum (Sirilli and Evangelista, 1998). The introduction of delivery innovation to the technical subsystem sends the strongest signals to managers to pursue management innovation. This finding corroborates previous research that has explored the social consequences of material changes in the workplace (e.g., Barley, 1990; Orlikowski, 1992). This research validates previous studies that have speculated how bridging between the technical and social subsystems can help innovation types form clusters and demonstrate complementarities (Battisti and Stoneman, 2010; Hervas-Oliver and Sempere-Ripoll, 2015; Hollen et al., 2013). This conclusion can be drawn in the case of coupling between the technical and the managerial subsystems as well as between the two social subsystems: customer interface and

managerial. Although customer interface innovation has a strongly significant and positive relationship with management innovation when inserted in the model on its own (Model 3), its relationship weakens in significance when technological innovation is added. This points to the fact that the correspondence of customer interface innovation with management innovation is partially carried by the coupling between the customer interface and technical subsystems. Although additional research is needed to further explore this finding, there seems nevertheless to be a certain weight of evidence that the interrelatedness among different types of delivery innovation is responsible for the relatedness with management innovation.

One of the most illuminating findings of this study concerns the role of the moderating variable—tangibility. The positive relationship of technological innovation was found to be stronger in companies at the higher end of the tangibility scale. However, this is not the case with customer interface innovation because it relates to management innovation if the offerings of firms are low on tangibility or indeed intangible. The position of the firm on the product–service continuum provides an explanation as to why some managers recognize the need to pair management innovation with service delivery innovation. The tangibility context shapes the cognitive structures of decision makers in such a way that certain organizational subsystems become more salient and are prioritized. Having a strong service component in the offering prompts managers to recognize the customer interface as a critical subsystem that interlinks with the managerial subsystem. Companies with tangible offerings are less likely to act on the need to adjust management structures, processes, and practices following customer interface delivery innovation. Managers in the more tangible firms may be preoccupied with material, visible issues and, therefore, inclined to recognize the need for change only when it involves technological delivery innovation.

Theoretical Implications

First, this study has overall implications for the literature on synchronous—or concurrent—innovation. As Damanpour et al. (2009) has noted, a finer-grained understanding of innovation activity is needed for services and "all possible associations among innovation types that might influence organizational performance should be explored" (Damanpour, 2014, p. 1279). Traditional sequential models such as the reversed product cycle (RPC) (Barras, 1990) were developed in information-rich service contexts (e.g., banking, accounting) and their core focus was technology-based product and process innovation. Non-technological innovation types have only very recently begun to receive research attention. In this research, exploration of the services context was taken a stage further by focusing on companies innovating their service delivery to gain competitive advantage. Customer interface delivery innovation was specifically highlighted as an innovation type that has been rather neglected to date but has the potential to be a major source of value creation. The role of tangibility as a moderator to the correspondence between delivery innovation and management innovation was also considered. The theoretical mechanisms of correspondence in different tangibility contexts were explained and, in so doing, the socio-technical perspective on the relatedness between different innovation forms was extended. This augmented perspective emphasizes the initial conditions of each firm in terms of its position on the product–service continuum and explores their implications for the cognitive structures of decision makers who need to make choices about linking innovation types.

Second, this study contributes to the literature on organizational adaptation and managerial cognition. Implicitly, the results confirm the critical role of decision makers, whose cognition and actions, exercised with competence and tempered by constraints, can shape the innovation trajectory of their organizations. Although recent management innovation studies address managers' roles as organizational change agents (Birkinshaw et al., 2008; Vaccaro et al., 2012), this current study shows precisely which organizational conditions act as mental cues or bounds for their decisions. For future research efforts, these findings highlight the importance of manager attentiveness in decision-making related to innovation. It is stressed that innovation involves a pattern of choices made by organizational actors. This study has shown that technological innovation produces stronger cues for management innovation in highly tangible contexts where the technical subsystem is clearly more salient. These cues are less noticeable in intangible contexts, where attention is more likely to be triggered by customer interface delivery innovation. Organizations with highly intangible offerings, such

as consultancies and law firms, are organized in such a way that organization-wide forms of innovation are more difficult to implement since they involve systemic socio-technical transformations (Anand et al., 2007). The managerial social subsystem in such organizations is often dissected into highly autonomous units with distinct areas of responsibility. Innovation in such contexts becomes a fragmented, nonlinear, and politicized process. The findings presented in this article support this view by showing that, even if technological delivery innovation is introduced, management innovation is not likely to be pursued.

Third, this study adds to the burgeoning servitization literature (Cusumano et al., 2015; Neely, 2008; Visnjic Kastalli and Van Looy, 2013). An important dilemma for servitizing companies is the challenge of adopting management practices and mindsets that are in line with the services strategies being pursued. The results demonstrate that the highly tangible environment—i.e., one in which the services offered are tied to physical products—is conducive to pairing management innovation with technological delivery innovation but not with customer interface delivery innovation. Existing cognitive structures shaped by the tangibility context erect a real barrier to fully exploiting synchronous innovation's potential to create new value. If managers fail to act on opportunities in the customer interface subsystem because they have a fixation with technological innovation, it is likely that the transition to a service business model will be further impeded (Visnjic et al., 2016). Although this insight does not offer a solution to this problem, it does present strong evidence on the nature and magnitude of its severity. Future research might investigate the strategies that could be employed to avoid this pitfall.

Managerial Implications

Servitization demands the alignment of organizational structures and systems to the new realities of delivery innovation. This current research study confirms that, in certain circumstances, it is very difficult for managers to perceive this necessity and move toward change. Customer interface innovation is especially vulnerable in tangible contexts since managers are less likely to consider management innovation even if they recognize the innovation's value creation potential. To address this shortcoming, managers and consultants advising servitizing companies could seek ways to shape perceptions that promote the customer interface as a core subsystem. Models and tools that visualize the customer interface and make it more tangible—such as service blueprints and customer journeys—can be introduced. Technological gadgets can be used as gimmicks attached to customer interface innovations to attract attention and signal the criticality of this type of innovation for the organization.

On the other hand, servitizing companies that are already further along the product–service continuum may experience difficulties with technological delivery innovation. Such innovations may not fulfill their promise in intangible contexts, so managers in such firms should be encouraged to believe that the technical subsystem can be a source of strategic advantage for the firm and deserves to be treated as such. Therefore, when new technological delivery innovations are introduced, firms should strive for their full implementation throughout the organization. Experimentation with new technologies should be followed up with replication of the best practices and scaling up of efficient operations. In this way, the intended benefits such as increased collaboration and efficiency can truly bring advantage to the firm since management innovation and technological innovation are able to develop in tandem.

Conclusion

This research contribution addresses an important but overlooked issue in innovation management—the relationships among various innovation forms in service contexts. This article's findings show that a focus of this kind can provide new insights into innovation management, managerial cognition, and servitization literature. They point to tangibility—a key characteristic of the service context—and its role in determining when and how service delivery innovation is associated with management innovation in organizations. This study has explored the multifaceted nature of delivery innovation by drawing on and extending the socio-technical systems perspective. Technological delivery innovation has been shown to have a stronger positive relationship with management innovation in tangible contexts. Customer interface delivery innovation, on the other hand, has proved to be positively related to management innovation only with firms already positioned on the intangible end of the product–service continuum.

Limitations and Future Research

This research effort is bound by several limitations that offer opportunities for future research. First, in some studies, product or process innovations are modeled as a consequence of management innovation or vice versa (Hollen et al., 2013). The debate on the sequence of innovation forms or their simultaneity is ongoing in the literature (Damanpour, 2014). The model adopted here has been built on the synchronous pattern view, which postulates that performance and competitive advantage can result from the skillful and complementary adoption of innovation forms (e.g., Damanpour et al., 2009). Although the conditions in which a lower (or no) correspondence between delivery innovation in services and management innovation exists has been demonstrated, future studies would do well to explore the patterns of adoption longitudinally. More in-depth process studies in representative cases could well unravel the possible co-evolutionary interplay between innovation types on a more micro-level. Second, this study has concentrated on service delivery innovation, which is highly relevant for achieving competitive advantage through services, but other innovation types also exist. The principle of parsimony has been attended to, and the hypotheses have been elaborated on the basis of the prevalent socio-technical systems view in the literature. It is argued in this paper that, by doing this, it is possible to cover a fair span of the innovation activity that occurs in services. Future studies should explore whether other innovation areas in more specific contexts are likely to relate to management innovation as well. In that respect, this study's measurement of the two delivery innovation types might be context bound and not extensive. Further studies are needed that adopt different approaches to the measurement of delivery innovation (e.g., based on observation or archival data) in order to fully grasp the synchronous innovation phenomenon. Another aspect omitted from this article's research design is the intra-organizational variation in innovation activity. Discrete innovation initiatives may have different effects on organizational functioning; some may draw larger attention than others. More research is needed to achieve finer-grade understanding of the projects more likely to exert a stronger impact on the cognitive structures of decision-makers.

Although the results of previous studies consistently confirm the importance of synchronous adoption of different innovation forms for organizational survival and performance, future studies should seek confirmatory answers to these ongoing questions in innovation research. The contribution that this study makes has been focused on delivery innovation in the services context and their role for management innovation; future studies may wish to look at the combinations of innovation types that provide benefits for the organization and analyze the conditions in which they gestate. This research has also chosen not to discriminate between specific management innovations, such as those directed at the development of a service climate, in which a specific set of management practices promoting high service quality standards among employees are deployed (Schneider et al., 2005). Research shows that, besides pursuing management innovation in general, such service-specific interventions can lead to positive customer and organizational outcomes (Hong, Liao, Hu, and Jiang, 2013). Future studies could be designed to explore how more specific forms of management innovation relate to delivery innovation in services contexts.

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Appendix. Measurement Scales with Factor Loadings[a]

Management Innovation (Vaccaro et al., 2012) (α = .86)	
1. Rules and procedures within our organization are regularly renewed.	.819
2. We regularly make changes to our employees' tasks and functions.	.817
3. Our organization regularly implements new management systems.	.804
4. The policy with regard to compensation has been changed in the last three years.	.608
5. The intra- and inter-departmental communication structure within our organization is regularly restructured.	.816
6. We continuously alter certain elements of the organizational structure.	.784
Technological Delivery Innovation (cf. Den Hertog, 2000; Gallouj and Weinstein, 1997) (α = .76)	
1. Technology plays an important role in the renewed production of our services.	.905
2. We renewed our service offerings by new or different use of ICTs.	.879
Customer Interface Delivery Innovation (cf. Den Hertog, 2000; Gallouj and Weinstein, 1997) (α = .85)	
1. Our organization developed new channels for communicating with our customers.	.928
2. The way we have contact with our customers is renewed.	.926
3. We changed the task distribution between ourselves and our customers.[b]	
Tangibility (cf. Mayer et al., 2009)	
1. Our services are attached to physical products that we are offering.	
Past Performance (cf. Robinson and Pearce, 1988) (α = .88)	
Compared to our main competitor …	
1. … our organization obtained a higher ROE in the past year.	.795
2. … our profit grew faster in the past year.	.888
3. … our revenue grew faster in the past year.	.905
4. … our market share grew faster in the past year.	.849
Innovation Leadership (cf. Gebauer et al., 2011; Narver et al., 2004) (α = .83)	
1. Competitors in this market recognize us as innovation leaders.	.882
2. We are first to market with new products or services.	.853
3. Customers view us as an innovative company.	.856
Industry Competitiveness (cf. Jaworski and Kohli, 1993) (α = .80)	
1. Competition in our industry is cut-throat.	.903
2. Our competitors are relatively strong.	.807
3. Anything that one competitor can offer, others can readily match.	.620
4. Price competition is a hallmark of our industry.	.851

[a]All items were measured on a seven-point scale, anchored by 1 = strongly disagree and 7 = strongly agree.
[b]Item deleted after exploratory factor analysis.