MANAGEMENT OF SERVICE INNOVATION QUALITY

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Chapter 3 Service innovation quality in healthcare: service innovativeness and organizational renewal as driving forces[2]

Drawing on an integration of service-dominant (S-D) logic and the dynamic capabilities approach, this study focuses on the relatively under-researched issue of service innovation quality in healthcare services. We propose a conceptual framework for the relationships between user-induced and organization-based renewal, and service innovation quality in the healthcare sector. By putting service innovativeness and organizational renewal at the input side of the healthcare organizations' value creation process, and treating service innovation quality as an output, this study hypothesizes direct relationships between these two ends. We conducted an empirical study in the Dutch healthcare sector. Based on a sample of 168 participants in service innovation projects in Dutch healthcare organizations, the empirical study verifies these hypothesized relationships. The results reveal that both service innovativeness and organizational renewal are significant antecedents of quality improvement of the healthcare service innovations in these projects. This study provides theoretical and managerial implications for improving the quality of healthcare service innovations. The key managerial insight is that healthcare organizations are implicated to pay more attention to continuous renewal of value propositions to their users/patients, as well as to continuous renewal of their organizations' functioning.

3.1 Introduction

Healthcare significantly affects quality of life and well-being of individuals and collectives (Berry and Bendapudi, 2007; Ostrom et al., 2015). Coping with quality pressures and aiming to capture future clinical and technological opportunities, the healthcare sector is active in *service innovation*, and introducing new healthcare services and procedures (Srivastava and Shainesh, 2015). This study views *service innovation* as any change that affects one or more terms of one or more service characteristics (Gallouj and Weinstein, 1997).

Numerous matters, however, challenge service management, quality control and quality improvement for healthcare service providers (Berry and Bendapudi, 2007). The complexity of the healthcare context may distinguish the innovation management concept in healthcare from that in other service sectors (Braa et al., 2007). *Service innovation quality*, as the intersection of service innovation and quality management, has been paid scant attention to, both in theory and practice. We define *service innovation quality* as the conformance of a service innovation's operational outcomes to the desired specifications.

Some studies on a prevailing issue of value creation in service innovation have emerged in other service sectors (e.g., O'Cass and Sok, 2013; Chen et al., 2015b; Skålén et al., 2015). However, with some exceptions (e.g., Srivastava and Shainesh, 2015), it is still underexplored how value is created in healthcare organizations' service innovation processes, where this value comes from, and what kinds of value can be assessed. This study responds to calls from service researchers for (1) a better understanding of both service innovation and its value creation aspect, and (2) scientific research on healthcare services and matters of well-being (Ostrom et al., 2015; Wilden et al., 2017).

Taking a look at two ends of the value creation process in healthcare service innovation, i.e., input and output, this study aims to answer the question underlying this research: What are the antecedents of service innovation quality in healthcare? We attempt to address this question from the perspective of how healthcare organizations provide increased value by means of service innovations. The unit of analysis in this study is healthcare service innovation, achieved by means of a project. We propose that at the input side of a healthcare service innovation project, value is increased by renewing the organization's internal functioning as well as renewing its user/patient approaches. At the output end, we use the quality of the service innovation that is developed by means of the project as an indicator of increased value in the healthcare service innovations.

The stream of research on service-dominant (S-D) logic views users/patients as value co-creators in the healthcare service production and delivery processes (Srivastava and Shainesh, 2015; Vargo and Lusch, 2016). Organizations contribute to the value creation process through offering new/improved value propositions to satisfy their

customers/users/patients. The dynamic capabilities approach conceptualizes organizations as entities that integrate, build and reconfigure internal and external resources and competences into new market/user/patient propositions to respond to rapidly changing environments (Teece, 2007). Such internal and external renewal can contribute to service innovation quality. One aspect of potential improvement of service innovation quality – based on S-D logic – is to renew the organization's value propositions to markets/users/patients, i.e., *service innovativeness* (Gatignon and Xuereb, 1997; Calantone et al., 2006); the other – based on a dynamic capabilities approach – is to opt for the renewal of organization's internal functioning, i.e., *organizational renewal* (Floyd and Lane, 2000; Danneels, 2002).

The objective of this study is to identify and then substantiate these two pathways in healthcare. Reflecting the call for an integration of S-D logic and the dynamic capabilities approach (Wilden et al., 2017), this study puts forward a theoretical conceptual framework and its related hypotheses, and then empirically tests these hypotheses. We conducted an empirical study in the Dutch healthcare sector to test our hypotheses. The sample consists of 168 respondents who are active in healthcare service innovation projects. A main outcome is that Dutch healthcare organizations in their projects complete high-quality service innovations through renewing their value propositions to users/patients, and/or renewing their organizational functioning.

The remainder of this paper is organized as follows. In the next section, we develop and formulate the theoretical background of the proposed conceptual framework and hypotheses. The method is crafted to formally test the hypotheses in the third section. Finally, we present the empirical results and a detailed discussion with main findings, implications and opportunities for further research respectively in the fourth and fifth section.

3.2 2. Theoretical background

3.2.1 Basic approach

In terms of value creation in the service innovation process, few studies have concentrated on it in general, or particularly in the healthcare sector. Among them, O'Cass and Sok (2013), Chen et al. (2015b) and Srivastava and Shainesh (2015) focused on business-to-business services, knowledge-intensive business services (KIBS) and healthcare services respectively. Studies on service innovation widely applied either S-D logic (e.g., Skålén et al., 2015; Srivastava and Shainesh, 2015) or the dynamic capabilities approach (e.g., Kindstrom et al., 2013; Chen et al., 2015b). We adopt an integrated approach in the emerging field of value creation in healthcare service innovation, by combining S-D logic and the dynamic capabilities approach.

Service-dominant (S-D) logic views customers/users/patients and organizations as co-creators of value in offerings to mutually develop beneficial value propositions (Vargo and Lusch, 2016). In a healthcare context, users/patients and healthcare organizations co-create value in their interactions with each other. The *dynamic capabilities approach* suggests that the renewal of resources and competences offers service organizations sustainable competitive advantages (Teece, 2007). It deals with capabilities of sensing, seizing and reconfiguring, and provides a perspective from which to undertake service innovation and strategic renewal (Kindstrom et al., 2013; Chen et al., 2015b).

By integrating and emphasizing S-D logic and the dynamic capabilities approach, healthcare organizations can gain sustainable strategic benefits from their service innovations. A focus on S-D logic leads healthcare organizations to value co-creation efforts. And by means of sensing, seizing and reconfiguring activities, healthcare organizations can implement renewal to serve users/patients in a changing healthcare context. We propose that innovating healthcare organizations need to invest in searching for and finding opportunities of service innovation (sensing). Next, they develop service innovations through exploring or exploiting these innovation opportunities (seizing). And then healthcare organizations work on accordingly transforming and recombining their resources and competences to serve the focal users/patients with these service innovations (reconfiguring).

3.2.2 Service innovativeness

Service innovativeness refers to the uniqueness or novelty of a service to the market or user groups, which we adapt from the concept of product innovativeness (Ali et al., 1995). Organizations strive for service innovativeness to keep in close touch with customers/users and their needs (Gatignon and Xuereb, 1997).

To a certain degree, customers/patients of healthcare organizations differ from customers in other service sectors. For instance, they are usually sick and under stress, and reluctant for 'unwanted' or 'annoying' healthcare services (Berry and Bendapudi, 2007). Serving them and meeting their specific demands and preferences present unique challenges to healthcare service providers. It is especially crucial for healthcare organizations to capture users'/patients' needs and wants, and understand and handle the conflicts between their needs and wants.

In S-D logic, value is not just simply added to services by the service providers, but also determined by the customers/users as the beneficiaries (Vargo and Lusch, 2016). A central criterion of service innovativeness is whether a significant increase in customer/user value is proposed in comparison to prior offerings (Schultz et al., 2013b). Service innovativeness introduces a new way to satisfy customers'/users' requirements, and opens up a new possibility to them (Ali et al., 1995). Services that are designed to be unique, reliable and

of high quality, are often considered successful (Cooper and de Brentani, 1991).

For incremental service innovations, focusing on new ways to fulfil customers'/users' previously unsatisfied needs, and providing them with a more satisfying experience or solution to their problem, can be an important basis for the differentiation of offerings (Berry, 1995; de Brentani, 2001). For radical service innovations, one-of-its-kind services establish a new service category or create a totally new market (Kock et al., 2011; Schultz et al., 2013b).

3.2.3 Service innovation quality

In the literature, service innovation performance is assessed as a multidimensional construct that reflects both operational and marketplace facets (Menor et al., 2002; Carbonell et al., 2009). The majority of research on service innovation has focused on its performance from a market/outcome perspective, with comparably fewer attempts to empirically address its operational/process performance (e.g., Froehle et al., 2000; Atuahene-Gima, 2003). As the demand for exploring the wider performance benefits of service innovation is growing (Menor et al., 2002), we concentrate on value creation in the service innovation process to investigate the performance in terms of *service innovation quality*.

Adapted from Carbonell et al. (2009), *service innovation quality* in this study describes the conformance of service innovation outcomes to the preset performance specifications. The concept of service innovation quality is similar to what others have labelled as conformance quality (Wu, 2010) and innovation process quality (Dervitsiotis, 2011). Due to the intangible characteristics of service and various categories of service innovation, we do not limit service innovation quality to the quality of a finally offered service. It also incorporates the conformance of other parts that are associated with the whole innovation process (e.g., changes of the service delivery approach, or the introduction of a new technology).

In the setting of healthcare, through renewing the service value proposition by means of a service innovation project, healthcare organizations improve their service innovativeness, resulting in a totally new or an improved service. This new/improved service aims to better satisfy users'/patients' needs, and induce renewal and value in a user/patient context. Unique and differentiated products or services tend to have product advantages, with relative higher quality than other similar offerings (Montoya-Weiss and Calantone, 1994; Gatignon and Xuereb, 1997; Calantone et al., 2006).

Based on the above theoretical points of departure, we put forward the first hypothesis as follows.

Hypothesis 1. Service innovativeness positively affects service innovation quality in

healthcare organizations.

3.2.4 Organizational renewal

Organizational renewal in this study involves the building of new or changes of existing organizational resources and capabilities (Danneels, 2002). *Organizational renewal* is different from the broad concept of strategy renewal, but similar to competence modification, as one sub-process of strategy renewal (Floyd and Lane, 2000). Many approaches help to enhance an organization's operational competencies and resource integration, such as a new established innovation-oriented culture, and optimized structure, processes and practices (Kock et al., 2011; Schultz et al., 2013b).

By developing internal resources and capabilities, service organizations are better able to recognise, shape and exploit (sense, seize and reconfigure) opportunities to co-create value in service innovation (Kowalkowski, 2011). Either a new operational method, service delivery system or marketing approach, helps to solve customers'/users' problems and provide new/improved service value. The healthcare context is characterized by multiple stakeholders and strong networks (Braa et al., 2007). The rapid changes in this context largely impact healthcare organizations. Organizational renewal is relevant to create the flexibility to respond to these changes in the organizations' external environment (Floyd and Lane, 2000), also for healthcare service providers.

Organizational renewal deals with organizations' resources and competencies from a dynamic perspective, and not opposing to organizational synergy. The concept of organizational synergy suggests that developing a service innovation by closely relying on the service organizations' current internal resources and competences seems to enhance performance or achieve success (Cooper and de Brentani, 1991; Song and Parry, 1997). Organizations with a wide range of technological, marketing and/or managerial synergy, are confronted with the importance of sticking to their core capabilities (Danneels and Kleinschmidt, 2001). Also, they encounter obstacles to organizations' internal renewal. These obstacles include employees' resistance to changes (Amabile et al., 1996) and organizations' self-reinforcement of historical paths (Schreyögg and Kliesch-Eberl, 2007).

In a healthcare setting, through renewing their internal functioning by means of a service innovation project, healthcare organizations acquire totally new or enhance existing operational capabilities (Calantone et al., 2006). These new/enhanced capabilities induce the renewal and value in an organizational context, and ensure the quality of the outcome of this service innovation project. Therefore, we expect that this healthcare service innovation has relatively higher innovation quality outcomes than its preset performance specifications and other similar innovations. Considering a similar reasoning for service innovativeness, we hypothesize the following linear and positive relationship between organizational renewal and service innovation quality.

Hypothesis 2. Organizational renewal positively affects service innovation quality in healthcare organizations.

The relationships that we put forward in these two hypotheses are shown in the research framework (depicted in Figure 3.1).
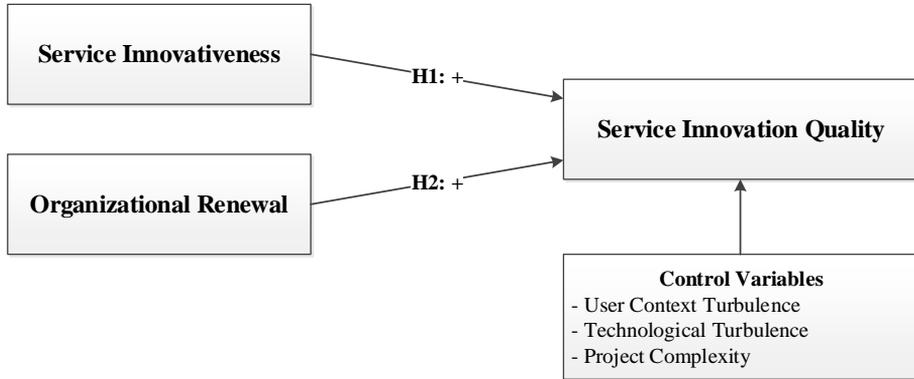
Figure 3.1 Proposed conceptual framework of Chapter 3

Project complexity, user context turbulence and technological turbulence are included as control variables for service innovation quality. These three covariates are related to broad uncertainties in service innovation projects. Project complexity indicates uncertainties within the innovating organization. User context turbulence and technological turbulence are controlled for environmental uncertainties and complexity (Calantone et al., 2003).

3.3 Method

3.3.1 Sample and response

With regard to the value-creating mechanisms of healthcare service innovation, Srivastava and Shainesh (2015) launch a representative study by means of a qualitative research design. We conduct a survey-based, quantitative study in this area, which to date remains relatively scarce. The empirical setting for this study is the Dutch healthcare sector. The unit of analysis is a healthcare service innovation that is realized in a project. This study employs a key informant approach to collect empirical data, due to the precedent of its use in innovation research at the project level (e.g., Chen et al., 2015a).

We drew a list of organizations operating in the Dutch healthcare sector from the REACH (Review and Analysis of Companies in Holland) directory. These healthcare organizations include hospitals, medical centers, clinics, medical group practices, and so on. Leaders who are in the position of managers (e.g., owner, chairman, director, head of department) or specialists who are involved in innovation or R&D activities (e.g., project leader,

scientist) are targeted as potential respondents. Employees who meet these criteria for inclusion are likely to have responsibility for, and/or extensive knowledge of service innovation activities in their organizations.

We carried out an online questionnaire survey to 1,598 key informants. A two-round pre-test and an online pilot test confirmed the appropriateness of the questionnaire. We sent out two reminders to the non-respondents. After three e-mailing rounds, we collected a total of 168 usable questionnaires, representing a response rate of 10.5%. The service innovation projects in which the respondents are active cover a broad spectrum of healthcare service innovations. Referring to the categorization of Avlonitis et al. (2001), we classify the innovations in the projects as new-to-the-market services (e.g., apps with medical instructions for patients), new or modified service lines (e.g., websites or long-time telephone services of medical consultation), new delivery processes (e.g., e-health platforms and modules), incremental service improvements (e.g., increased intensity of rehabilitation), repositioning of existing services (e.g., redesign of the mission and ambition), to cost-reducing innovations (e.g., introduction of lean management). Table 3.1 and Table 3.2 show the projects' composition and respondents' demographic characteristics respectively.

Table 3.1 Projects' composition

Project category			Project duration			Project team size [a]		
Category of the innovation	n	%	Month	n	%	Range	n	%
New-to-the-market service	47	28.0	≤1	6	3.6	≤1-4	70	41.7
New service line	16	9.5	2-6	21	12.5	5-9	60	35.7
Addition to existing service line	18	10.7	7-12	37	22.0	10-14	16	9.5
New delivery process	6	3.6	13-18	30	17.9	15-19	5	3.0
Improvements/Revisions to existing service	48	28.6	19-24	31	18.5	20-24	2	1.2
Service repositioning	7	4.2	≥25	43	25.6	≥25	15	8.9
Cost reduction	7	4.2						
Other	19	11.3						
Total	168	100	Total	168	100	Total	168	100

[a] Number of employees in the project team.

Table 3.2 Respondents' demographic characteristics

Gender			Age			Education			Work experience		
Category	n	%	Year	n	%	Category	n	%	Year	n	%
Male	100	59.5	26-35	26	15.5	High school or less	2	1.2	1-2	10	6.0
Female	68	40.5	36-45	38	22.6	Some college	4	2.4	3-5	41	24.4
			46-55	58	34.5	Bachelor's degree	30	17.9	6-10	37	22.0
			≥56	46	27.4	Master's degree	71	42.3	11-15	28	16.7
						Doctoral degree	57	33.9	16-20	15	8.9
						Other	4	2.4	≥21	37	22.0
Total	168	100	Total	168	100	Total	168	100	Total	168	100

On a five-point scale, the mean of the key informants' knowledgeability is 4.48, and the mean of their involvement degree is 4.42. Considering the respondent's role in the innovation project, 44% is project leader, 33% is supervisor and 19% is member of the project team. Only 4% (7 respondents) is not involved in the project, and has a relatively low average knowledgeability of 2.71, which is still above the middle value of 2.5. The composition of the projects and characteristics of the respondents verify the appropriateness of these samples and key informants.

We conducted two post-hoc tests to assess common method bias. Harman's single-factor test and a common method variable approach suggest no serious problems with common method bias (Podsakoff et al., 2003). To test for nonresponse bias, we compared the answers from the early and late respondents (Armstrong and Overton, 1977). A series of Mann-Whitney U-tests reveal no significant differences between two subgroups ($p<0.05$).

3.3.2 Measures

We employed reflective measurement models for all the latent variables. Measurement items of the constructs are mostly based on existing scales that have shown reliability and validity in previous studies. Unless noted otherwise, five-point Likert-style scales were used (1 = 'strongly disagree' to 5 = 'strongly agree'). Table 3.3 gives a measurement summary with all items, and their sources and loadings.

Table 3.3 Items for construct measurement of Chapter 3

Construct (Source)	Measure of construct	OL	HCL
Service innovation quality (SIQ) (Kessler and Bierly, 2002; Lin et al., 2012)	Quality of the innovation was better than that of…		
	SIQ1. … the preset performance specifications.	0.79 ****	0.31
	SIQ2. … our similar completed innovations.	0.87 ****	0.25
	SIQ3. … similar innovations completed by other organizations.	0.87 ****	0.29
Service innovativeness (SI) (Schultz et al., 2013b)	SI1. The innovation offered new user value not offered before by any other services.	0.77 ****	0.28
	SI2. The innovation created a totally new service category.	0.78 ****	0.32
	SI3. The innovation changed the way our user context functions.	0.74 ****	0.31
Organizational renewal (OR) (Avlonitis et al., 2001; Schultz et al., 2013b)	In order to develop and introduce the innovation, we had to significantly change our…		
	OR1. … organizational structure.	0.73 ****	0.20
	OR2. … service delivery system.	0.85 ****	0.24
	OR3. … organizational culture.	0.82 ****	0.21
	OR4. … R&D and/or marketing practices.	0.82 ****	0.31
User context turbulence (UCT) (Danneels and Sethi, 2011; Dayan and Di Benedetto, 2011)	UCT1. Users' demands and preferences changed quite a bit over time.	0.70 ****	0.22
	UCT2. Users tended to look for new services all the time.	0.71 ****	0.15
	UCT3. We witnessed demands for our services from users who were never served by us before.	0.77 ****	0.42
	UCT4. New users tended to have service-related needs that were different from those of our existing users.	0.80 ****	0.36
Technological turbulence (TT) (Danneels and Sethi, 2011; Candi et al., 2013)	TT1. The technology in our industry changed rapidly.	0.93 ****	0.23
	TT2. Technological changes provided big opportunities in our industry.	0.92 ****	0.18
	TT3. A large number of innovative ideas have been made possible through technological breakthroughs in our industry.	0.88 ****	0.13
	TT4. Technological developments in our industry were rather minor. [ab]	n.a.	n.a.

Table 3.3 (continued)

Construct (Source)	Measure of construct	OL	HCL
Project complexity (PC) (self-developed)	PC1. The innovation project is complex.	0.91 ****	0.27
	PC2. Project duration [c]	0.69 ****	0.15
	PC3. Project team size [ad]	n.a.	n.a.
n.a.	Your knowledge of the innovation project is extensive.	n.a.	n.a.
n.a.	Your degree of involvement in the innovation project is high.	n.a.	n.a.

Note: All items were scored on a five-point Likert-style scale (1 = 'strongly disagree' to 5 = 'strongly agree') unless indicated otherwise. OL=Outer loading, HCL=Highest cross loading, n.a.=not applicable.

[a]Item deleted.

[b]Reverse coded.

[c]Six-point rating scale: 1 = ≤ 1 month, 2 = 2-6 months, 3 = 7-12 months, 4 = 13-18 months, 5 = 19-24 months, and 6 = ≥25 months.

[d]Six-point rating scale: 1 = 1-4 employees, 2 = 5-9 employees, 3 = 10-14 employees, 4 = 15-19 employees, 5 = 20-24 employees, and 6 = ≥25 employees.

****$p<0.001$; two-tailed.

Service innovation quality. We used a relative measure of three items, which is adopted from Kessler and Bierly (2002) and Lin et al. (2012).

Service innovativeness. A three-item scale is adapted for market innovativeness from Schultz et al. (2013b).

Organizational renewal. We combined three items measuring organizational innovativeness from Schultz et al. (2013b) with one additional item from Avlonitis et al. (2001).

Control variables. We measured user context turbulence and technological turbulence by a four-item scale for each (Danneels and Sethi, 2011; Dayan and Di Benedetto, 2011; Candi et al., 2013). Three indicators are included for project complexity.

3.4 Analysis and results

3.4.1 Measurement properties: measurement model assessment

We applied SmartPLS 3 to obtain partial least squares structural equation models (PLS-SEMs) for both the measurement and the structural model. PLS-SEM is employed, as it is based on a distribution-free assumption, and exhibits higher statistical power than covariance-based structural equation modelling (CB-SEM) for models with relatively small samples (Sarstedt et al., 2016). Two items (TT4 and PC3) were deleted after comprehensive consideration of their outer loading (OL), composite reliability (CR), and

average variance extracted (AVE) (Hair et al., 2011).

For all constructs, their CRs reach values above the required threshold of 0.7, suggesting a satisfactory internal consistency reliability (Hair et al., 2017). OLs of most indicators are above the rigorous cut-off value of 0.708 for indicator reliability (Hair et al., 2011). All AVEs exceed the recommended threshold of 0.5 for convergent validity (Fornell and Larcker, 1981). We inspected discriminant validity in three ways: the Fornell-Larcker criterion, assessment of the cross-loadings, and the Heterotrait-Monotrait (HTMT) approach (Fornell and Larcker, 1981; Hair et al., 2011; Henseler et al., 2015). Overall, almost all measures meet or exceed the recommended values, indicating an adequate level of reliability and validity. These related indexes can be found in Table 3.3 and Table 3.4.

Table 3.4 CR, AVE, square root of AVE, correlations and HTMT ratios of the constructs in Chapter 3

Construct	CR	AVE	1	2	3	4	5	6
1. Service innovation quality	0.88	0.71	(0.84)	0.44	0.32	0.35	0.22	0.40
2. Service innovativeness	0.81	0.58	0.32	(0.76)	0.33	0.50	0.22	0.31
3. Organizational renewal	0.88	0.65	0.28	0.24	(0.81)	0.26	0.14	0.33
4. User context turbulence	0.83	0.55	0.28	0.36	0.21	(0.74)	0.17	0.16
5. Technological turbulence	0.94	0.83	0.21	0.19	0.13	0.15	(0.91)	0.08
6. Project complexity	0.78	0.65	0.26	0.17	0.23	0.06	0.07	(0.80)

Note: The square roots of AVE values are shown on the diagonal (between parentheses). Correlations and HTMT ratios are reported in the lower and upper half of the matrix respectively.

CR=Composite reliability, AVE=Average variance extracted, HTMT=Heterotrait-Monotrait.

3.4.2 Hypotheses testing: structural model estimation and evaluation

We investigated the direct effects of the model for the hypothesized effects. All variance inflation factors (VIFs) are less than 1.24, which are well below the cut-off point of 5, so we perceive no severe collinearity problems (Hair et al., 2017).

The coefficient of determination (R^2) and Stone-Geisser's Q^2 are examined to assess the model's predictive accuracy and relevance. A blindfolding procedure is used to obtain the Q^2 value. The R^2 and Q^2 value of service innovation quality is 0.213 and 0.125 respectively.

We used a bootstrapping procedure (5,000 samples; 168 cases; no sign changes) to test the statistical significance of path coefficients. In support of both hypotheses, the results reveal that service innovativeness (H1, β=0.18, f^2=0.033, p<0.01) and organizational renewal (H2, β=0.14, f^2=0.023, p<0.05) positively affect service innovation quality. Both positive effects are verified with a significant path coefficient and small f^2 effect size (see Table 3.5).

The effect of service innovativeness (β=0.18, f^2=0.033, q^2=0.013) on service innovation quality is higher than that of organizational renewal (β=0.14, f^2=0.023, q^2= 0.012). Both path coefficient and effect sizes confirm this conclusion.

Table 3.5 Results of hypotheses testing in Chapter 3

Path	Path coefficient (*t*-value)	f^2 effect size	q^2 effect size	Hypothesis supported?
Service innovativeness → SIQ	0.18 (2.69) ***	0.033	0.013	H1 – Yes
Organizational renewal → SIQ	0.14 (2.18) **	0.023	0.012	H2 – Yes
User context turbulence → SIQ	0.16 (2.13) **	0.027	0.015	
Technological turbulence → SIQ	0.12 (1.79) *	0.017	0.007	
Project complexity → SIQ	0.18 (2.98) ***	0.039	0.020	

Note: SIQ=Service innovation quality.

***p<0.01, **p<0.05, *p<0.1; two-tailed.

3.5 Discussion

3.5.1 Summary of findings

Some main findings can be summarized from our research. Firstly, this study empirically supports our hypothesis that service innovativeness positively affects healthcare service innovation quality. Previous research has found that the innovativeness of manufactured products is positively related to their product advantage, and product quality is an essential aspect of product advantage (Montoya-Weiss and Calantone, 1994; Gatignon and Xuereb, 1997; Calantone et al., 2006). Our revealed relationship of innovativeness and quality in healthcare service is in line with the link between innovativeness and product advantage in manufacturing sectors. Like organizations in manufacturing and other service contexts, healthcare organizations achieve service innovativeness in order to increase user/patient value and fulfil their unsatisfied needs, by providing users/patients with totally new ways of patient care, and more satisfying experiences or problem solutions (Ali et al., 1995; Berry, 1995; de Brentani, 2001). We find that healthcare organizations renew their service value propositions in service innovation projects, and accomplish good quality innovation outcomes. This can be illustrated by a great number of practical service innovation examples from our data. Examples in the Dutch healthcare organizations include: applying advanced technologies (e.g., image care, remote technology) in existing care processes; providing new online treatments via websites to specific patient groups (e.g., girls with an eating disorder); and developing new therapy modules.

Secondly, the empirical results support our hypothesis that organizational renewal has a positive effect on healthcare service innovation quality. Although Kock et al. (2011)

verified that organizations' internal changes had a negative impact on commercial success of new products (i.e., market performance), the scope of our study is different and encompasses innovation quality (i.e., operational or process performance). Also, prior findings have shown that organizational synergy increases innovation performance (Danneels and Kleinschmidt, 2001), and specifically the implementation quality (Song and Parry, 1997). As organizational renewal and organizational synergy are not two opposite concepts, there is no contradiction in these empirical findings between our study and the extant literature. Through renewing internal capabilities and resources, organizations enhance operational capabilities and resource integration (Calantone et al., 2006). It is also the case for healthcare organizations. Our empirical evidence indicates that numerous innovation practices in Dutch healthcare services produce quality outcomes. These practices involve optimized operational methods (e.g., development of a client administration system), improved service delivery systems (e.g. introduction of lean management for large patient groups), and new marketing approaches (e.g., 100% responsible e-consultation).

Furthermore, we empirically demonstrate that the effect of service innovativeness on healthcare service innovation quality is relatively higher than the effect of organizational renewal. Previous research has not estimated these distinct effects by simultaneously entering both antecedents in one procedure (i.e., simultaneous estimation), hence no comparable results have been found. Renewing value propositions and renewing internal resources and capabilities both incorporate considerable uncertainties. But due to the barriers and resistance to organization renewal from employees and the organization itself (Amabile et al., 1996; Schreyögg and Kliesch-Eberl, 2007), renewing internal resources and capabilities is less effective for increasing healthcare service innovation quality. Besides, renewing the organizational structure and system also supports future innovation activities and projects (Danneels, 2002). Therefore, organizational renewal may have other positive effects on future innovation projects' outcomes apart from the focal one.

3.5.2 Theoretical and managerial implications

Extant literature on the issue of value creation in service innovation mainly focuses on the economics-oriented service sector, e.g., business-to-business services and knowledge-intensive business service (KIBS) (O'Cass and Sok, 2013; Chen et al., 2015b). Investigating the service-dominant (S-D) logic (cf. Vargo and Lusch, 2016) and the dynamic capabilities approach (cf. Teece, 2007), this study sheds new light on the innovation management of healthcare services. This research reflects the call for an investigation of the two research streams (Wilden et al., 2017). We identify a linkage between input and output of value creation in the healthcare service innovation process, by taking user-induced service innovativeness and organization-based internal renewal as

inputs, and service innovation quality as an output. Also, we empirically validate the two pathways in this linkage. To our knowledge, this is the first study that examines the distinct impacts of two fields of service innovativeness and organizational renewal simultaneously.

We derive some implications for innovation management practices of healthcare services from our findings. Healthcare organizations can benefit from the notion that service innovativeness results in new value propositions and quality innovation outcomes. Healthcare organizations can try to figure out user-induced opportunities and risks, as well as users'/patients' problems, in order to offer totally new or improved healthcare services.

The research results imply that healthcare organizations should also pay attention to the value of organizational renewal. To fit with the new requirements of healthcare service innovation projects and their outcomes, changes in the organizational structure, practices, and service delivery system can contribute to the healthcare service innovation quality. However, organizational renewal encounters barriers from both managers and employees, which must be coped with.

Another practical implication is associated with the finding of the higher effect of service innovativeness on service innovation quality than organizational renewal. In management practice, there is an emphasis on the importance of organizational renewal as a pre-requisite for the successful implementation of innovations by means of a project. Our finding suggests that in the context of healthcare a focus on service innovativeness appears to have a stronger positive effect on service innovation quality.

3.5.3 Limitations and directions for future research

There are several limitations to this study. The first one is related to the empirical sample and setting. The sample comprises healthcare organizations in the Netherlands. Statistical validity of our findings is limited to the Dutch healthcare context. The sample size is relatively small, although we find no serious problem with nonresponse bias in this study, and also PLS-SEM can deal with this smaller sample size. Future research could replicate this study with a complementary and larger sample, and/or broaden and test its statistical generalizability in other industries.

Moreover, we use a single key informant approach for data collection, which may result in the potential presence of common method bias (Podsakoff et al., 2003). Although we make considerable efforts (both procedural and statistical remedies) to alleviate this issue, there are inevitably limitations, of which a multi-informant, longitudinal empirical design is nearly free.

Finally, our proposed model is relatively simple, and just covers two direct effects on service innovation quality. Crucial insights can be gleaned from modelling more complex relationships into simple ones, by adding in mediators and/or moderators. Model extension

can account for the variance not explained by the model in this study. Besides, our study does not explore the effectiveness and efficiency aspects of service innovation performance. Even though these themes are beyond the scope of our research approach, their relationships with(in) our model could be a fruitful direction for further research.