Service Innovations in Health Care Service Ecosystem: A Case Study

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ABSTRACT - In service economy, scholars and practitioners focus on the development and the appliance of innovative services. The importance of service innovation is rising in many sectors and among different organizations. Several disciplines (e.g. marketing, management, operations research, etc.) focus on this innovation, a concept widely used, but with different definitions. In this paper, service innovation has been analyzed according to SD Logic and a service ecosystem perspective. Literature still call for a deeper understanding of how new or renewed resources' combination affect the shaping of service ecosystems. To contribute to fill this gap, the study explores the practices that different actors, internal and external to a healthcare service ecosystem, enact to co-create value in novel ways that is service innovation. The paper is structured as follows. In the next section, the main academic contributions on service research have been reviewed, focusing on healthcare service innovation. Follows, the research method and the discussion of research findings. Finally, theoretical and managerial implications have been detailed and an agenda for future research suggested. The paper offers interesting insights to develop new or renewed practices that foster the reshaping and maintaining of a healthcare service ecosystem. Some recommendations are included to support managers in the development of service innovation strategies.

Key words: innovation, service innovation, healthcare, chronic diseases, SD Logic.

1. Introduction

Over the last decades, healthcare has experienced important challenges in changing its policies and practices to face the pressure of rising costs, regulations, and innovation [1]. In this sector, innovation is one of the liveliest issue, being a large amount of the research budget allocated on it and in particular on new or innovative pharmaceutical, biotechnological, medical, and health products or services [2]. A new cultural *milieu* is arising, focused on patient and its requirements, which have to be merged to innovations and technologies to achieve successful outcomes [3, 4]. Consequently, the health care community is increasingly aware about the importance to transform its traditional orientation [5] to

promote new and advanced services, able to respond to the needs of a global society and experienced patients [6]. Moreover, healthcare professionals are asked for a better disposition to cooperate with several actors in order to make medicine a real collaborative science [5] and offer innovative services pointing to social wellbeing [7]. To this end, various and emergent technologies can support healthcare evolution, making services has open, enjoyable, and patient-oriented as possible. However, to achieve this goal the involvement and the direct participation of several different actors (e.g. institutions, healthcare providers, ONGs, physicians, citizens, etc.) to innovative processes, pointing to co-create value, can make healthcare service as respondent as possible to social needs and expectations. This is particularly evident when related to chronic or acute diseases (e.g. cardiovascular disease, hypertension, diabetes, dyslipidemia), which treatment can benefit from the emergence and the appliance of innovative services. In fact, these diseases request specific treatments often based on advanced protocols, techniques, or technological tools that offer an even more effective treatment's program able to positively affect patients' social and physical life.

In literature, the need for a better investigation of service innovations' in healthcare is emerging. However, in broader terms the study of innovation is often mainly related to the notion of service [8, 9, 10], considered the key element of the modern service economy and the so-called service innovation [11, 12, 13]. Service has been analyzed according to different theoretical perspective, moving from the traditional view that looks at service or at service products as companies offering to clients or to a generic market to SD Logic view [14, 15, 16], according to which service is a "value co-creation in exchanges between resource integrating actors" [12, p.136]. It worth to underline that SD Logic represent the theoretical foundation of service science and of the investigation of value creation processes in service systems [17, 18]. In particular, it counteracts the traditional Good Dominant (GD) Logic, representing the foundational framework to better define and understand service and its role in competitive exchanges [19].

In this stream of research, SD Logic offers a new approach also to service innovation, emerging from the contribution of different disciplines (e.g. marketing, management, information systems etc.) highlighting the fundamental role of ICTs in fostering markets' transformation and development [13]. However, as stated before, the appliance of SD Logic to healthcare is new; thus, little literature exists under that term [19]. In this direction, starting from McColl-Kennedy et al. [20, 21] seminal works, this study is aimed at contributing to fill this gap investigating not only the interaction occurring between the ecosystem actors at micro level, but also those typical of the other ecosystem levels. The present paper also delves on the influence that the interactions occurring among and between the actors belonging to the different ecosystem levels have on the emergence of brand new services in line with the changing patients' expectations and demands for a safe, comfortable, friendly,

informative and actionable approach to health care, which represent an important emergent service setting. To achieve this goal, the study briefly reviews the most important theoretical approaches to service innovation, starting from the traditional ones until to the most recent ones, which highlight the importance to integrate different actors' resources to co-create value. Following this stream of research and with the aim to fill the above-mentioned gap existing in academic literature, the study aims to discuss the emergence and the influence of service innovation in shaping a healthcare service ecosystem. In this direction, practices are intended as a set of routinized actions, consisting of tools, know-how, images, physical space that one or more than an actor use to create value [22, 23].

In particular, this paper has been also focused on the analysis of an innovative service ecosystem that is a private Italian clinic offering services for renal diseases. Understanding health care as a service ecosystem arising from an innovative approach to resource integration or from service innovation requires a focus not only on focal firm approach to innovation, but also on the contribution of several internal and external actors to the rethinking of medical services that is the way to co-create value [24]. The insights of case study analysis supported the theoretical discussion about the role and characteristics of service innovation in health care. According to a service ecosystem perspective, this study addresses the main research questions:

RQ1: *Which practices are implemented to foster service innovation?*

RQ2: *How actors co-create value in novel and useful way?*

The paper has been structured as follows. In the next section, the main academic contributions on the advancement of service research have been reviewed, with a specific focus on the evolution of innovation and in particular of service innovation in healthcare. In the next section, the research method has been detailed; follows, the discussion of findings achieved through arose from the case study analysis. Finally, theoretical and managerial implications have been detailed and an agenda for future research has been suggested.

2. Insights on service research

2.1 Framing service innovation: a general overview

The lively debate about the significance and the importance of innovation has lasted to this day since it started during the first decades of the XX century, when Schumpeter [18] defined what innovation was. Following a traditional approach to innovation, scholars have investigated this topic according to a firm or output-centric view [24, 29], while an emerging approach mainly focuses on a service-based view of innovation is emerging [30, 31, 32]. Different research fields, such as marketing [29, 33], economics [29, 30], information systems [31, 32], operations [33, 34] and strategy [35], investigated innovation in service. Among the studies on this topic, two research paths emerged; the

first one based on the enlightenment of differences between "product innovation" and "service innovation" [36, 37]. The second one focused on the analysis of a possible adaptation of the existing theories and models on innovation to a concrete service context [38]. Following Ostrom et al. [39] "Service innovation creates value for customers, employees, business owners, alliance partners, and communities through new and/or improved service offerings, service processes, and service business models." (p. 5).

In this direction, a new conceptualization of innovation is emerging, putting a great emphasis on its inner relational and collaborative nature [40, 41, 42]. In fact, scholars are even more frequently looking at innovation as a process involving different actors able to share and combine resources in new or innovative ways [43, 44]. Moreover, few are the studies aimed at defining the categories and models of service innovation [45, 46, 30, 13]; thus, they mainly point to define the sources of this innovation and, at the same time, the way different actors cooperate to innovate [42, 43]. These two stream of research have been criticized; literature [30, 44, 13] calls for a third and synthetic approach to innovation able to embrace every kind of innovation across sectors and industries, in which the focus is shifted on the analysis of the real multiple actors' contribution in changing value co-creation processes, the related practices and the actors that enact them [45].

In service management, value co-creation is considered the primary basis of innovation. In this stream of research, SD Logic has overcame the traditional partition not only between "product" and "service", but also value "producer" and "consumer", focusing on actors ability in resource integration and in assuming the role both of service provider and beneficiary in a context of service-for-service exchange [46]. More in depth, SD Logic considers service innovation as the ability of actors in co-creating value through an original, different and often better resources' integration [13, 47].   In fact, according to this perspective, co-creation "depict a new and a promising vision of innovation" [48, p.527] and can be considered as an innovation factor able to foster the change and a better adaptation to the context in which it arises. Therefore, SD Logic [48, 12, 13] looks at service innovation as directly related to value co-creation processes, involving in a systemic way different entities or actors [49]. Consistent with this perspective, service innovation is "inherently network-centric, value and experience focused, and span[s] the tangible–intangible divide" [15, p.157].   In fact, it roots on the reassembling of different resources, pointing to create new ones, which should be able to benefit different interacting actors. It has to be noted that according to a system thinking logic [50, 51] or a service ecosystems perspective [53]. These interactions commonly occur in a specific context. Both economic and social actors contribute to the building of service ecosystems [53, 54]. Thus, these actors are "spontaneously sensing and responding spatial and temporal structure of largely loosely coupled, value-proposing social and economic actors interacting through institutions,

technology and language to (1) co-produce service offering; (2) engage in service provision, and (3) co-create value" [53, p.185]. Being nested and loosely coupled by nature, service ecosystems are characterized by several different and interacting levels [55, 56], a micro (e.g. households, organizations, etc.), meso (e.g. industries, communities, etc.), and macro (e.g. nations, global markets, etc.) level. At all these levels, the ecosystem actors share their resources and integrate them to create new ones (resources integration) and exchange services in order to contribute to co-create value [57, 58]. Moreover, institutions (enduring rules, norms, values and beliefs) and institutional arrangements (sets of interrelated institutions) are at the core of service ecosystems place [59], being institutions multifaceted and long-lasting social structures [60] build on symbolic and material elements. Thus, institutions and institutional arrangements drive the way actors integrate their resources in service ecosystems [56] to create mutual value.

According to an ecosystem perspective, service innovation concerns the reconfiguration of institutional structures, a process aimed at changing rules, norms and values at the roots of resources integration [59, 61]. Consequently, organizations no longer look at innovation as a proprietary and internal process, but they consider it as a social process involving several different actors or entities within and across organizations [62]. In this context, institutions play an essential role in defining the way resources can be integrated and in underlining those rules, norms, values and beliefs at the core of their integration. Therefore, innovation can be considered as a process pointing to change value co-creation practices and the related institutionalized rules [52]. A systemic, dynamic, and multi-actors or multi-entities approach to value creation is able to affect the inner nature of innovation, which is seen as a process of deinstitutionalization and/or re-institutionalization of the practices at the core of value co-creation [52]. However, service research still calls for better understand the way actors change the institutionalized rules needed for the integration of several and different resources at multiple levels of a service ecosystem that in sum foster service innovations or value co-creation processes.

2.2 Service innovation in healthcare

In healthcare, innovation plays an even more important role, being mainly oriented to offer new approaches, practices, and tools pointing to reduce costs and improve the quality of life. In this domain, organizations act in an unpredictable and dynamic context, where decision-makers have to manage complex interactions between several different actors or entities (e.g. patients, health providers and suppliers, etc.).

Innovation can support these organizations in facing and overcoming several challenges and concerns emerging from a complex and ever-changing context. In fact, scholars underlining that numerous and blazing innovations has interested medicine, pointed out that they were able not only to enhance their ability to respond to patients expectations in terms of life expectancy, quality of life, diagnosis and treatments procedures, but also to make organizations more efficient and effective [63]. Nevertheless, several inefficiencies still affect healthcare. Even if scholars are seeking to overcome these inefficiencies, literature still suffers from a fragmented approach to healthcare innovation and, in particular, to healthcare service innovation [64].

A brief literature review underlines that the most of innovation in healthcare system generally assumes an output-centric focus, being oriented to the development of new or renewed medical products and/or tools designed to offer new medical treatments. The output-centric logic that drives the most of medical innovation make it mainly intended to the development of new devices and tools (e.g. electronic recordkeeping, electronic medical record, computerized tomography scanning, etc.) aiming to support physicians and practitioners in offering patients smarter, faster, better and coast effective services [64, p.564]. Drawing on the previous considerations, it is evident that innovation in healthcare still follows a GD Logic approach [17], being focused on the development of new or renewed products and/or tools. It follows that healthcare providers are still considered experienced, knowledgeable, innovative, and creative as well as creator/source of value, while patients are inexperienced, unknowledgeable, passive or even value destroyers [63]. This opposition still characterizes healthcare, even if it has evolved towards a patient-centric and/or a wellness care, a personalized and consumer-driven approach, a patient engagement and other emergent features [64, 65, 66]. This consumer-driven approach has also led to the emergence of a renewed approach to healthcare service, based on the shifting from the traditional technology push approach to healthcare innovation towards a collaborative and service-centered one. Being this renewed and service-centered approach to innovation in healthcare still under investigated, the present work aims to fill this gap, offering an overview on the way different actors are engaged in the co-creation of innovative service following the cooperative and collaborative logic at the roots of the service ecosystem logic. Drawing on the previous considerations, healthcare innovation has been loosely defined as the "introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention and research, and with the long term goals of improving quality, safety, outcomes, efficiency and costs" [67, p.5]. This statement underlines that healthcare innovation still lacks of a service perspective; thus, this domain is oriented towards "innovation in service" which is mainly focused on technological dimension of innovation, concerning the changes occurring within an activity or a sector [68]. However, the conceptualization

of "innovation in service" counters with the more recent notion of "service innovation", referred to the change that look at organizations as able to stimulate new, renewed or novel services [69, 70] in terms of innovative approach to knowledge application and management, with the ultimate goal to increase their viability in their own context [71]. The lack of a service approach to health innovation is mainly due to the enduring separation between health providers and patients, which can be reduced trough a patient-centered approach to care, based on a real patients involvement medical paths and treatments. To counteract this situation, SD Logic make finally possible to overcome a liner and technologic approach to innovation. In this respect, both health providers and consumers are sensing, experiencing, creating, integrating resources and learning [15], in other words, they are able to co-create value using their applied knowledge and skills to benefit each other. Therefore, service innovation is inherently interactional and based on the ongoing adjustment of each involved actor able to learn the way to exchange service-for-service according to a win-win logic in a value network, enabling a healthcare service ecosystem. Entities or actors belonging to a service ecosystem contribute to the emergence of interconnected networks able to create over the time not only new entities/actors, but also new interactions that ensure the long term viability of the nested service systems, offering social and economic wellbeing.

In healthcare, sharing resources, goals and pathways, different actors can contribute to the co-creation of public health [72]; consequently, a new or renewed approach to resources integration can led to innovate the way actors co-create the above-mentioned wellbeing. In this domain, the emergence of a patient-centered approach has led to the development of several new interactions among and between different actors directly or indirectly involved in healthcare system.

Literature underlined that actors' continuous participation in value co-creation process is deeply influenced by both their past and present knowledge and experience [73, 74]. In this respect, some studies investigated value co-creation process within the focal dyad doctors and outpatients (micro level), finding out that it is influenced by the following critical issues: social context, actors' believes and perceptions, and partnerships among actors [75]. The emergence of a system-thinking enables a multi-actors perspective that looks at healthcare as service ecosystem in which numerous actors interact within and across different levels, sharing their resources to create new ones [76, 77, 78]. Following healthcare service ecosystem perspective, some researchers developed those practices that contributes to shape a dynamic service ecosystem, defining the role that they have on ecosystem wellbeing [20]. All actors that interact in a health service ecosystem contribute to the improvement of its services [77] through emergent coordination mechanisms, active at operational, political, social, economic, legal or ethical level [72]. Consequently, co-creation seems to be a research priority even

when related to the better understanding the ways health providers achieve service innovation through combining/recombining novel or renewed resources.

In fact, service innovation research emphasizes the primary role of resources' integration in an ecosystem perspective, according to which this integration can led to the ongoing emergence of new or renewed resources [56]. An emerging research path focuses on innovation ability in changing the way different actors current or new medical resources are integrated or shared to deinstitutionalize and re-institutionalize value co-creation practices [52]. This body of literature points to a deep investigation of service innovation emergence in a networked and information-centric world [13] where actors share resources in order to achieve novel value co-creation practices [79]. Consequently, resources do not have value *per se* [14]; rather value is co-created when actors (e.g. firms, customers, etc.) integrate their resources that is value is realized in use [14, 80].

Recent theoretical advancement underlined the need for service ecosystem perspective, according to which, in a many-to-many environment, all actors should collaborate and integrate resources to co-create value for themselves and several others. In this respect, scholars investigated how co-creation practices can shape a healthcare service ecosystem [21]. In particular, adopting a patient-centered model of healthcare, scholars depict some practices that according to a structural approach affect value co-creation at micro, meso and macro levels. Consequently, according to a dynamic approach, those practices can have positive or disruptive impact on value co-creation in the healthcare service ecosystem. Following a dynamic and active approach to resource sharing, the interactions among all ecosystem actors (e.g. patients, health providers, firms, institutions, etc.), that is the way they creatively combine or recombine their resources, represent a primary source of innovation and, consequently, of value creation also in healthcare [81, 82].

3. Research methodology

3.1 Research approach

To investigate the healthcare innovations according to a service ecosystem perspective and depict the achieved theoretical findings, the case study method was implemented [83, 84]; thus, this method is particular suitable for practice-oriented fields and to respond to "how" research question [85]. The case study methodology supports the achieving of a better understanding of complex social phenomena [86] such as multi-actor contribution to service innovation in a critical domain such as healthcare. In this way, it was possible to collect data from several sources and answer the questions at the roots of this research [87]. Following Gummesson, to delve with the complex reality of management studies, qualitative methodologies, empowered by modern natural science, are "[…] superior to quantitative methodology emanating from traditional natural science" [88, p.171]. In this

direction, other scholars [89, 85] considered qualitative methods more fitting with the in-depth investigation of a new phenomenon, such as the emerging of healthcare service innovations.

The analysis focused on a single case study settled in Italian healthcare system (*Nephrocare*) and on its approach to service innovation, based on multiple actors' interactions occurring at different ecosystem levels and inspiring new or innovative value propositions able to co-create mutual value. The case study analysis followed the following five steps: 1) definition of the object of study; 2) case selection; 3) building of initial theory through a literature review; 4) data gathering collection and organising; 5) analysis of data and research conclusions.

The analysis started with the investigation of how the interaction between different ecosystem actors should foster the emergence of service innovation in health care domain. In this direction, the case study offered insights into means/practices through which different (internal and external) actors contribute to the emergence of health care service innovation, considering them according to SD Logic perspective. To this end, several data collection methods were used. Following the traditional approach to case study, the analysis of business documents, reports and notes as well as some interviews and on-site observation were conducted. In particular, being one of the widely used technique to collect data in interpretative case study, interviews tries to combine the findings and converge on their tentative illustration [85, 90].

3.2 Sample, data collection and analysis

Following the theoretical sampling approach, an extreme case was selected [88, 83]. In fact, the case company, belonging to a network of medical clinics for renal diseases, represents an innovative ecosystem in which multiple actors are engaged to co-create value. Moreover, in this dynamic ecosystem relationships between different interacting actors are fundamental, enabling an ongoing resources sharing. Several information were collected to define how service innovation unfolds on different levels of a service ecosystem. In order to get information on value co-creation practices that foster service innovation, a desk-top study was performed, analysing corporate reports and handbooks, brochures, scientific papers provided by the company or accessed by surfing its corporate web sites and social networks. Before starting the harvesting of the most relevant evidences, a research protocol was outlined to organize data in digital worksheets and make authors able to individually analyse them. Hereafter, evidences were classified according to the different resources integrations that foster the reconfiguration of value co-creation process that is service innovation. At first, authors individually analysed each practice and then all of them critically revised them. To support the achieved results the 20 unstructured interviews were conducted.

These interviews were administered by a set of open-ended questions and conducted on the interviewees' company premises. At first, case company's executives (Service Innovation manager, Human Resources manager, Quality manager, Local General manager) were interviewed to achieve a general perspective on case company strategic orientation towards innovation. Then, following a top-down approach, service managers (Research and Development manager, Marketing manager, Public Hospital General manager) were interviewed. Finally, in order to achieve information about how innovative actions/practices were implemented, some physicians (doctors and nurses) and representative employees were interviewed.

Open-ended questions were used to encourage the interviewed to actively participate in an open dialogue with the interviewers. The interviews lasted, on the average, 45 minutes; they were audiotaped and then verbatim transcribed. The collected evidences were classified in homogeneous categories according to the topic and source in order to improve their comparability. The recognition of relevant texts and themes provided the material of the narrative presented in the following sections. All collected data and information were critically examined and a research report was written. In particular, the categories used to classify the evidences gathered trough the interviews are the following: 1) Institutionalization of renewed business models; 2) Rethinking the approach to services; 3) Development and sharing of new and advanced competences; and 4) New Market Development. The above-mentioned categories entails the practices that the focal company and the other ecosystem actors implemented to renew the care of renal diseases and the related services, paving the way for a better understanding of how these actor contribute to constantly innovate the way they co-create health value.

4. Findings

4.1 The case company

Nephrocare is a private healthcare provider, belonging to the holding Fresenius Medical Care, the world's leading provider of products and services for people with chronic kidney failures, which offers through its specialized clinics and centers medical services for patients affected by renal diseases. In particular, Nehprocare, thanks to its departments active all over the world, today is a dialysis centers' international network able to offer specialized and customized care all across the Europe, Middle East, Africa, and Latin America. Since the first center was opened in 1994, the current 880 Nephrocare clinics treat about 91,000 patients per year. Currently, Nephrocare centers count over 21.000 employees, who offer a complete and high quality service to renal patients.

Nephrocare mission states, "We want to help and alleviate the suffering of people affected by kidney diseases". To achieve this goal, the company has developed a business model pointing to

include not only the active participation of patients, but also of other healthcare service organizations, such as government agencies, public authorities and public/private providers. The company is also deeply committed into the empowerment of its globalized medical and not medical staff, offering them not only different online and offline learning opportunities, but also the possibility to be part of a modern cooperative working environment. Continuous investments support the development and the viability of this dialysis centers' international network.

To this end, the focus on innovation has led the company to enact some specific and shared practices led to institutionalize new and innovative services, according to different resources integration. In other words, innovation emerging from collaborative and cooperative efforts, made with patients and others actors, towards the definition of new ways to create value.

4.2 Path of healthcare service innovation

Each practice/path described and analyzed below presented different features in terms of interacting actors, role, ecosystem level and the innovation that they contribute to shape. The practices that contribute to the emergence of the service ecosystem shaped around the focal company (Nephrocare) depicted some common traits (the rethinking, the reshaping, the rebuilding and the maintaining) of the way actors share, combine and recombine their resources. According to an ecosystem view, Nephrocare was conceptualized as the focal actor, being able to foster the interactions between and among the actors belonging to different systems or in the same ecosystem at different levels, making them able to participate to the development of health service innovation.

4.2.1 Institutionalization of renewed business models

Until few years ago, Nephrocare conceived innovation just as technology based, pointing to improve medical performance in terms of quality and costs. More recently, the traditional output-centric approach to innovation has shifted toward a service-centered approach, pointing to rethink the way medical services are conceived and provisioned. This has led to replace traditional practices, building up new ones that involve actors such as public healthcare providers in order to create new rules able to make the treatment of renal diseases not only as effective as possible, but also in line with real and ever-changing needs of patients and their families. In particular, this renewed approach had a direct influence especially on Italian National Healthcare System, fostering its opening towards a service logic supported and somewhat inspired by the patient centric approach to kidney diseases developed and sustained by Nephrocare.

The emergence of an effective and patient-centered approach to the care of renal disease has led to the development of an innovative business model, based on the collaboration, cooperation, knowledge and skills sharing between Nephrocare and the physicians of Bolognini public Hospital, settled in Lombardia region. The spread of public-private partnerships led to the emergence of a new model of medical assistance that is a hybrid model able to share competences and generate service innovations pointing to customize each care path. This kind of partnership also led to the building of new public ambulatory, directly managed by Nephrocare medical manager, able to offer locally advanced services according to a public service logic. The emergence of this new business model (public/private healthcare services) roots on the deep understanding of some critical elements of Italian National Healthcare System (NHS). These elements are needs, the lack of a dense network of specialized clinics able to effectively and efficiently serve citizens, public hospital needed for an update and, consequently, for new practices and services in line with current health demand. This brand new scenario arose not only from the interaction with patients, but also from the collaboration, cooperation and experience sharing with other actors belonging at different levels to healthcare service ecosystem (i.e. nurses, medical manager, managers and physicians of public hospitals, institutions, universities, etc.). In this direction, Nephrocare reshaped the Department of Nephrology of Bolognini Hospital, in order to share and apply the most advanced medical and learning technologies, in order to offer to the Department and to public local care centers more effective organization. The strong and ongoing orientation to quality has led these structures to a more sustainable resources management, offering them a straight orientation to the future and to viability. The Bolognini Hospital's General Manager summarized "*In 2010 we launched a public-private partnership, being supported and collaborating with Nephrocare. To this end, we signed a cooperation agreement of 9-year, which allowed us to define and implement a new management model based on investment and dissemination of best educational technology and an efficient organization of medical staff and dialysis centers. In this light, Nephrocare's skills supported our ability to serve a wide basin of patients in order to make our public hospital able to enhance the quality of care, for example managing the department of nephrology and dialysis of our hospital and six decentralized dialysis units (1 CAD and 5 CAL) that assist about 200 patients*".

Cooperating with other public and private ecosystem actors, Nephrocare defined new medical standards, which implementation contributed to the reshaping and maintaining of healthcare service ecosystem, orienting it to patient-centered, efficient and effective medical practices. The Director of Nephrology, Dialysis, and Transplantation of University of Pavia reported "*In 2009, we established a co-operation with Nephrocare to carry out several clinical audits aimed at a better management of*

blood pressure and bone metabolism, based on the most recent studies and scientific evidences. This led to the appliance of theoretical scientific skills to a real medical environment. This collaboration led us and our partners to increase and hybridize internal expertise".

Nephrocare identified new practices pointing to enhance patient/physicians interactions and to create a novel *corpus* of knowledge and skills based on mutual contribution of different ecosystem actors.

4.2.2 Rethinking the approach to services

Nephrocare adopted a new approach to services development and provisioning based on strategic goals pointing to a continuous improvement of both medical treatment and the related services. This has been possible thanks to a deep resource reconfiguration pointing to respond in a novel way to an enduring need. In this direction, the renewed approach to services roots on a growing attention to patients' needs and requirements pointing to offer shared and novel solutions. Moreover, patient is directly involved in care path going beyond his/her emotional, psychosocial and situational participation. Therefore**,** a big change was made, implementing innovative technologies (ICTs), characterized by a new and high processing, communicative and informative potential able to make technologies at the roots of new advanced medical services comprehensible, familiar and somewhat human both for physicians and patients. This platform represent a concrete and technological value proposition, which became a real service innovation thanks to the disposition of all ecosystem actors to share their resource in order to achieve brand new combination. Nephrocare Quality Manager reported, "*The Interactive Management System Data 'EuCliD5' is one of the largest database dedicated to the practice of dialysis. It is our flagship pointing to the continuous improvement of services and care quality. Its novelty lays on the monitoring of clinic issues related to patient care, possible thanks to an ongoing data collection and assessment pointing to improve dialysis outcomes. This system is directly connected to dialysis machines to record in real time patient data and the medical parameters of each dialysis sessions".* Ultimately, the informative system represents a new value proposition in which occurs an ongoing resources' exchange between different actors, such as other physicians, researchers, ICTs companies, experts and patients. Fresenius R&D Manager reported, "*Collaborating with Nephrocare, we have jointly developed innovative technologies that our medical staff, interacting with patients, has contributed to make as human and acceptable as possible. In particular, EuCliD5 is a tool aimed at the continuous improvement of the treatment provided to patients, which benefits from practice sharing, data sharing and transparency".*

In this way, the managerial board gain information about patients' everyday medical situations, problems, and ideas about care path and their health status. The introduction of this informative system radically changed the way physicians and patients interact. To build up new services,

Nephrocare established a direct relationship with their patients thanks to a continuous assessment of their satisfaction, possible thanks to the specific program "Patient Satisfaction". The human resources manager explained, "*The program named 'Patient Satisfaction' aims to highlight possible patients and families discontent and at the same time to fuel our ability to solve them. For example, some improvement measures affected fire emergency procedures, the better understanding of clinical problems such as the differences between hemodialysis and hemodiafiltration, the electronic data collection, the overall quality of services improvement*".

As a long-term effect, the implementation of the informative system EuCliD5 foster the development and the adoption of new practices in all Nephrocare's clinics, contributing to institutionalize the renewed approach to medical services and define some good practices able to ensure the maintain of care and related service quality. A Nephrocare partner also supported this approach, the TUV (Technischer Überwachungsverein), which Marketing Manager stated, "*Good practice or Good Dialysis Practice led to the definition and the implementation of ongoing new service standards. These point to make, unlike other centers, clinics and hospitals, the service experience not only as pleasant and friendly as possible, but also healthy and safe both for the patients and for staff*". Moreover, the database embedded in the informative system enabled the arising in different moment and among different actors of a synergistic circle. In fact, data collected through the informative system can be processed and compared with those of other clinic belonging to Nephrocare network in order to define the best practices that should inspire all networked organizational units.

4.2.3 Development and sharing of new and advanced competences

Nephrocare considers doctors, nurses, and all its employees' fundamental for its network success; thus, a new online e-learning platform was developed, in order to make them able to gain ever-updated skills and competences. This novel tool radically changed corporate approach to professional learning, breaking with the traditional and offline training programs mainly based on face-to-face learning, team lessons, meetings and symposiums. In fact, when managerial board decided to implement this platform a brand new approach to leaning in healthcare arouse; thus, this advanced tool made Nephrocare employees able to share information, define, validate and adopt new medical procedures, institutionalize new standards and rules fundamental for the development of new or renewed services that is new value co-creation processes. In this direction, the Human Resources Manager explained, "*Doctors, nurses and, all employees are at the core of Nephrocare. In fact, the company offers them ever-updated training courses, based on an innovative online platform, which make them able to keep up to date and respond to different patients' needs. We have tied the professional training courses to the results of patients' audit that is performed annually since 2008.*

In other words, the 'Patient Satisfaction Program' recording patients' needs, demands, complaints and suggestions allows us to customize our collaborators' training and consequently the services and assistance they lend". The e-learning platform represent a new and joint value proposition, based on a more convenient resources sharing and integration for all the participant actors: the employees of Nephrocare International network (e.g. physicians, nurses, researchers, pharmacists, managers, etc.). Consequently, service innovation arise from the recombination or new combination of resources, pointing to offer new responses to patients' needs.

Being a new joint value proposition, the e-learning platform allowed value creation making actors able to achieve value using it and integrating its own knowledge and skills with several others, such as personal (e.g. learning and medical skills), public (e.g. job position) and market (e.g. online service, medical textbooks, experience sharing) competences. The different interacting actors were conscious not only about the importance and the potential of this platform, but also about its ability in changing the "rules of the game" at the roots of knowledge and experiences sharing in healthcare. An informant physician stated, "*In Nephrocare we can count on a continuing training system, which allows us to be always able to regularly use technologies, tools and innovative protocols that the company implements. This allows us to do our job as better as we can using all the available facilities that contribute to improve medical services and organizational procedures. We can also communicate and share information and experiences with our colleagues in Italy and abroad thanks to a series of technological tools, such as our online TV 'Infovision' and informative programs, based on newsletter and chats as 'Medical Flashlight' and 'Nursing Now'".* This platform led to definition of brand new learning services, based on an ongoing training and on the ability to share and access the experiences of other actors belonging to Nephrocare network. These services are fueled constantly by employees and managers participation, pointing to offer a growing and ever-updated knowledge to each participant actor.

4.2.4 New Market Development

Nephrocare engaged several different actors in co-creating a new approach to the care of kidney diseases based not only on effective and customized services emerging by patients and physicians experience sharing, but also on ability to develop, implement and make as human as possible the most recent medical technologies. Consequently, much more than traditional clinics, Nephrocare networked clinics offered several advanced medical tools and protocols (value proposition). In fact, it completely rethought the traditional approach to emo-filtration, making their patients able to experience a new approach to emo-filtration, merging innovative technologies, chemical and physical solutions in order to remove from blood a higher quantity of liquids and toxin than the traditional

hemodialysis. In fact, Fresenius Service Innovation Manager reported, "*The cooperation with Nephrocare was aimed at developing advanced tools and services thanks to the implementation of the most recent technologies, in order to significantly reduce the rate of hospitalization and mortality among dialysis patients. To this end was a new procedure was developed and implemented, the Hemofiltration online, which offers better outcomes and a longer life expectations. The Hemofiltration online is based on a new technological equipment that removes from blood a larger amount of liquid together with the metabolic toxins if compared to a 'normal' hemodialysis. This technology helps in reducing inflammation, as it significantly lowers the level of reactive protein if compared to what happens in traditional treatment*".

This advanced tool designed for the hemodialysis opened new interesting commercial opportunities for Fresenius and Nephrocare; thus, a growing number of clinics and hospital in Europe, then in several foreign countries purchased, and adopted the innovative technology designed for the online hemofiltration. The development and the broad adoption of this technology contributed to respond to the need for a renewed, effective and as safe as possible approach to the dialysis. Moreover, the focus on its continuous improvement contributed to technological, medical and commercial stabilization of the hemofiltration online, establishing new rules and standards in the current treatments of kidney diseases and offering better outcomes to patients. The emerging of these new rules and standards was supported by several research, conducted by different ecosystem actors, such as biologists, medical researchers, data companies and many others.

Much more than a traditional approach to medical care and in particular of chronic diseases such are the renal affections, Nephrocare included in its international network a variety of interacting actors, who not only share resources and recombine them to offer novel service, but also sometimes belong to other ecosystems. In particular, the service ecosystem built around the focal company is grounded in the integration of several actors belonging not only to medical or scientific fields, but also to other specific fields such as education, entertainment and tourism. The establishment of specific partnerships with actors operating in other sectors such as entertainment and tourism led Nephrocare to completely rethink the traditional approach to the treatment of kidney diseases and to patient lifestyle. Consequently, the company reshaped the approach to the provision of medical services, contributing to offer them a human and patient-centered nature, pointing to make kidney patients able to live a life as normal and safe as possible in every situation, even when they decide to go on holiday. To this end, Nephrocare established specific and close partnership with some international tourist operators and other companies active in accommodation and entertainment. In particular, they contribute to make patients able to experience a high quality and safe holiday, being characterized by high competencies in tourism management and in particular in medical tourism. In fact, these actors

are able to support people affected by kidney diseases offering advanced solutions and service in order to merge they need for spend a life as normal as possible, but also for a rapid and professional medical support. Therefore, the partnership with several actors active in tourism and accommodation led Nephrocare network to support their patients in travelling allover the most important and attractive destinations. A new market has been built, the so-called "dialysis holiday", able to respond to medical needs and the aspiration to a normal life of kidney patients. Nephrocare Marketing Manager explained, "*Dialyze three times a week does not mean stop travel abroad and go on vacation. Our new service called 'Dialysis holiday' gives the opportunity to visit other dialysis centers around the world and at the same time allows you to enjoy holidays. Therefore, whether you want to travel, you can continue to enjoy an active life, visiting new places or simply relaxing by the sea. In fact, we have established some important partnerships with international operators, in order to offer to our patients the best holidays we can, choosing for them hotels, restaurants and other high quality structure, equipped to respond to their leisure and prime medical needs. This is possible thanks to a direct connection with local network of Nephrocare dialysis centers, which are equipped to offer the service patients are used to all over the world*".

The ability of the focal company to share the same rules and values in a great number of country all over the world contributed to the definition and enhancement of some innovative services, covering both medical and leisure need (e.g. hotel and restaurant selection, booking, medical and commercial communication etc.). In this way novel services have been created, organized around what is important to a specific cluster of tourist such as kidney patients and aligns them to their medical and leisure's needs.

5. Discussions

Research findings pointed out interesting insights on the influence that different actors (e.*g*. medical staff, administrative staff, other medical or not medical organizations, institutions, patients etc.) and their personal resources (e.g. knowledge, dynamic interactions, etc.) play in the emergence of service innovations. In particular, the paths of service innovation are fuelled by a circular and synergistic logic detached in the following table (see tab.1). In fact, the actions at the roots of the above-mentioned practices, which occur at different ecosystem levels, promote the viability of the investigated service ecosystem. In other words, actions like the rethinking, the re-shaping, the rebuilding and, of course, the maintaining of the institutional arrangements at the core of those practices that led to service innovation contribute to the emergence and the ongoing renovation of the health care service ecosystem [91]. Consequently, this ecosystem is not only adaptive, but also able to reconfigure their resource integration to respond better to patients' demand.

Table 1: patterns of medical service innovation.

Service Innovation	Ecosystem Level	Rethinking (co-decision making)	Reshaping	Rebuilding	Maintaining
Business models	Micro, Meso, Macro	Redefining the relationship with public healthcare providers (to better manage the treatment of kidney diseases).	Establishing public/private partnerships.	Creating new local medical centres and novel medical standards.	Adhering to a strong patient-centred orientation and defining specific programs of patient/ physician interaction.
Approaches to services	Meso	Developing a novel approach to service design and provisioning based on a synergistic logic and multi actor contribution.	Creating new technological value propositions.	Converting new technological value propositions into service innovation thanks to several actors' resources sharing.	Institutionalizing the renewed approach to service. Establishing direct relationship with patient in order to ensure services ever updated and in line with their needs.
Competences	Micro, Meso	Changing the traditional development and sharing of competences and skills.	Defining new way to interact, learn and communicate.	Developing and implementing an e-learning platform.	Sharing core competencies from both internal and external actors.
Market	Meso, Macro	Rethinking of traditional medical procedures.	Defining a renewed approach to resource integration across traditional services.	Implementing an informative system able to record and process in real time care data.	Defining and following best practices.
	Micro, Meso	Opening the number and the ecosystem origin of interacting actors.	Opening healthcare service ecosystem to the interaction with other service ecosystems.	Establishing partnerships with actors external to healthcare service ecosystem to create innovative services merging leisure and medical needs.	Institutionalizing practices able to create new, advanced, cross-sectorial and standardized services.

Source: our elaboration.

In fact, the findings of this paper underlined the dynamic nature of service innovation as rooted on specific institutional changes, emerging from some interdependent processes and the influence they have on service ecosystem configuration. In this direction, service innovation can be considered a dynamic process pointing to change the current configuration of a specific service ecosystem based on the conjoint action of multiple actors [92]. Following a circular logic, actors' interactions, within and across service ecosystems, foster the rethinking, the reshaping, the rebuilding and the maintaining of resource integration at the core of value creation.

The case study showed not only how these steps contribute to change and reshape a service ecosystem through the emergence and the institutionalization of new or renewed practices (RQ1: *Which practices are implemented to foster service innovation?)*, but also the way ecosystem actors change co-creation processes (RQ2: *How actors co-create value in novel and useful way?).*

Findings underlines that the ability of the focal company in establishing inter-organizational relationships led it to go beyond its sectorial boundaries, involving other institutional actors (e.g. other public and/or private medical providers) in forging practices able to change the rules of

healthcare service provisioning, fostering the emerging of a new business model [94]. In particular, the case company contributed to the emergence of a novel and hybrid healthcare business model, establishing a long-lasting partnership with Bolognini public Hospital and the department of Nephrology, Dialysis, and Transplantation of University of Pavia that led to the definition of innovative medical standards and to the creation of new local public medical centres. The ability to detect new opportunities for co-creation has make company able to institutionalize a new business model that enables higher resource density for value creation [94] shifting from a traditional business model based on a hierarchical system and competition towards a new one oriented to collaboration and social networking.

The case company also developed and institutionalized a renewed approach to medical service, converting a new value proposition that is the innovative informative system (EuCliD5) into a concrete service innovation [52] thanks to the conjoint action of several different actors open to share and combine their resources to create new ones. This is possible changing the way things are done, for example choosing to digitally record, compute and share data about current medical treatments and change actors' access to these data. This new informative system has led to the development of new and productive collaborations [95] that led healthcare providers to deal with several external conditions, such as networking, the cooperation and the cross-fertilization with third parties often belonging to different sectors, market evolution and the existent regulation [41]. To enforce its renewed approach to service, Nephrocare also developed an innovative e-learning platform, aimed at offering new or renewed resources (e.g. knowledge) and practices in order to make actors able to create new value propositions that is service innovation [96, 52]. In fact, new value propositions arise from actors' ability to interact and change together, sharing processes, roles and skills. To this end, in a service system orchestration is even more important, emphasizing that a re-assembling or a re-evaluation of the whole actors' network is sometimes necessary to make them able to participate to value creation processes. In this direction, the case company interacted with external actors (e.g. ICTs service providers, other physicians, patients, etc.) whose resource contributed to the renovation of its medical services.

Nephrocare was also able to develop new rules/standards for the whole healthcare industry through the institutionalization of a new value proposition that is the hemofiltration online, a new technology that it firstly implemented and then other public and private providers purchased and implemented. This led to a general enhancement of kidney care thanks to the institutionalization of those practices pointing to quality assurance using innovative medical practices drawing on critical social outcomes, such as the reduction of hospitalization and mortality among dialysis patients, the reduction of the rate of physicians' errors, a longer life expectation. According to a dynamic and social-oriented

perspective, technology is not only an essential tool to find out new ways to join different actors in service innovation processes, but also an element able to foster the emergence of new and ongoing innovations.

Findings also showed that a renewed approach to market as well as the emergence of new markets could be fostered also including new and sometimes external actors in a service ecosystem, such as tourist operators or companies active in specific sectors as accommodation or leisure. This happened when Nephrocare decided to integrate new actors into its network, establishing some partnerships with brand owners of tourism, accommodation and leisure sectors, in order to offer to its patients a high quality medical assistance even when they are on holidays. Therefore, the case company assigned to these actors different roles and responsibilities and guided them towards new practices aimed at resource integration through which healthcare service ecosystem was deeply reconfigured [94]. In our case, service innovation fostered the shaping of a new market, such as medical tourism, providing ecosystem actors with alternative frames of sense-making, enabling the emergence of new occurrence of "resourceness" [59].

6. Implications and Further Research

This paper explores the most recent advancements in service domain; thus, following service ecosystem perspective [13, 52] it focused on service innovation and its influence on service ecosystem reshaping. This renovation, based on a circular logic, involves several actors interacting within and across service ecosystems to foster the rethinking, reshaping, rebuilding and maintaining of resource integration at the core of value creation. To better understand the influence of service innovation on a specific and complex service ecosystem, it has been investigated in a specific and critical domain such as healthcare.

The theoretical implication of the present research underlined how actors internal and, in some occasions, external to an healthcare service ecosystem are involved in those ongoing value co-creation processes able to foster the emergence of innovation from new value propositions that they institutionalize participating to service exchange and value co-creation [52]. In this direction, the paper try to contribute to literature recent call for a better conceptualization of service innovation and its influence on service ecosystems ongoing reconfiguration.

Following a service ecosystem approach to healthcare innovation led to embrace an actor-to-actor logic, according to which the traditional division between "producers" (healthcare providers) and "consumers" (patients) [45] and even "innovators" and "adopters" is blurred. In this direction, research findings underlined the new or renewed practices able to foster and maintain the reconfiguration of a healthcare service ecosystem, involving several different internal and external

ecosystem actors, redefining their roles and reframing the resources they share. However, to better understand the potential of innovation in reframing a service ecosystem, further research are needed, in order to emphasize the systemic nature of service innovation and overcome the traditional out-centric approach that still seems to be preeminent also service innovation research [96, 41, 42]. Moreover, the investigation of service innovation in different contexts apart from the healthcare should contribute to a deeper conceptualization of innovation as an institutional change process [59]. In terms of managerial implications, findings underlined that in a service ecosystem a concrete and useful innovation needs for a balanced resources' combination based on institutionalized and shared rules that actors can easily adopt. In this direction, managers should facilitate the inclusion of new and somewhat external actors, able to share new and different resources to change, reshape and maintain the new configuration of a specific service ecosystem.

In other words, decision-makers should govern and manage service ecosystems through ongoing learning process that led them to adapt/model constantly themselves to the changing requirements of a context characterized by a growing complexity. This strategic conduct might contribute to the improvement of physical and psychological conditions not only of patients directly involved in service process, but also of social context, not forgetting to foster public awareness about how healthcare advancement benefits social wellness [97, 98]. Even if a service ecosystem approach to innovation offers interesting insights for marketing and management to rethink, redesign, rebuild and maintain the practices at the core of value co-creation, much research is still needed to deeper the potential of innovation on the reconfiguration of different service ecosystems. In this direction, this study opens to interesting and further research paths that, according to the adaptation theory, point to underline the systemic and relational nature of service innovation in a service ecosystem perspective.

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