

Leveraging service design for healthcare transformation

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Leveraging service design for healthcare transformation: toward people-centered, integrated, and technology-enabled healthcare systems

Service design
for healthcare
transformation

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Abstract

Purpose – This paper explores how service design can contribute to the evolution of health service systems, moving them toward people-centered, integrated and technology-enabled care; the paper develops a research agenda to leverage service design research for healthcare transformation.

Design/methodology/approach – This conceptual study starts by analyzing healthcare challenges in terms of demographic trends and economic constraints, along with the problems of lack of people-centricity, dispersion of care and slowness in incorporating emerging technologies. Then, it examines the theoretical underpinnings of service design to develop a framework for exploring how a human-centered, transformative and service systems approach can contribute to addressing healthcare challenges, with illustrative cases of service design research in healthcare being given.

The research work related to the project “Recovery.Net” was funded as part of the Welfare in Action program of Cariplo Foundation (<http://welfareinazione.fondazioneCARIPLO.it>). The research work related to robotic care was supported by the European Union’s Horizon 2020 research and innovation programme under the Marie Skłodowska Curie grant agreement No. 642116. The research work related to the development of the Portuguese Electronic Health Record was supported by the Portuguese Ministry of Health.



Findings – The proposed framework explores how a human-centered service design approach can leverage the potential of technology and advance healthcare systems toward people-centered care; how a transformative service design approach can go beyond explanatory research of healthcare phenomena to develop innovative solutions for healthcare change and wellbeing; and how a service systems perspective can address the complexity of healthcare systems, hence moving toward integrated care.

Originality/value – This paper systematizes and develops a framework for how service design can contribute to healthcare transformation. It identifies key healthcare application areas for future service design research and pathways for advancing service design in healthcare by using new interdisciplinary bridges, methodological developments and theoretical foundations.

Keywords Service design, Service system transformation, Healthcare service, People-centered care, Integrated care, Technology-enabled services

Paper type Conceptual paper

Introduction

Healthcare is an immensely expensive, complex and critical service that significantly affects economies worldwide, not to mention the quality of people's daily lives (Berry and Bendapudi, 2007). Healthcare touches virtually everyone at some point in their life and is the backbone of individual and societal wellbeing (Danaher and Gallan, 2016). The vision of healthcare has evolved toward a more people-centered and integrated care system and ensures that they receive a continuum of healthcare throughout their lives (WHO, 2016). However, making this vision come true requires understanding healthcare challenges and undertaking profound transformations in the health system. The increasing number of elderly individuals and high healthcare costs have become the primary reasons for the increased pressure on healthcare systems. The evolution toward people-centered and integrated care has been hampered by traditional practices that view patients as passive receivers of healthcare and by a system that is fragmented and increasingly complex (Lee and Hall, 2010). Additionally, emerging technologies and data offer immense opportunities for healthcare, but the potential of new technology and data solutions remains largely unfulfilled (Kellermann and Jones, 2013). To make the necessary transformation toward a new vision of healthcare, it is important to rethink and redesign health service systems to leverage technology and empower people in cocreating their health.

Service design can contribute toward healthcare transformation by providing a human-centered, holistic and iterative approach to the creation of new services (Blomkvist *et al.*, 2010). By understanding human experiences and translating this understanding in the design of new service futures (Sangiorgi *et al.*, 2019b), as well as by actively engaging people in transformation processes through participatory design approaches (Meroni and Sangiorgi, 2011), service design has adopted a human-centered approach from its start. Service design takes a creative and transformative approach to envisioning new futures, coupling this with a holistic service systems perspective; hence, it provides an integrative approach for innovating complex healthcare systems and design for social change (Sangiorgi *et al.*, 2017).

Therefore, service design offers promising contributions to catalyze health system transformation toward a new vision of care. Exemplar applications of service design in healthcare contexts include the creative exploration of social robots roles for the cocreation of elderly care (Čaić *et al.*, 2018) or the use of service design to change ingrained norms and beliefs in mental health services (Vink *et al.*, 2019). For example, service design has been applied to establish three physical colabs in the Lombardy region in Italy. Engaging patients, relatives, professionals, associations and local actors, service design has supported a codesign effort to collaboratively envision how these labs could promote a more community-based and cocreated form of mental healthcare. Despite these scattered instances of service design applications in healthcare systems, the role of service design in healthcare transformation remains largely uncharted; indeed, service design has been mostly focused on studying incremental change and experience-based design initiatives. To explore how

service design can achieve its full potential, it is important to develop a more structured and systemic understanding of healthcare challenges and of how service design can contribute toward overcoming the barriers that hamper obtaining this new vision of healthcare.

The current paper develops a framework and research agenda to leverage service design to evolve toward a new vision of healthcare. Building on the examination of healthcare challenges and service design's theoretical underpinnings and approaches, the present paper first reveals how a human-centered and participatory approach can leverage technology and move healthcare systems toward providing people-centered care. Second, the present paper highlights how a creative and transformative service design approach can go beyond explanatory research of healthcare phenomena to develop innovative solutions that foster the change of enduring norms, roles and beliefs for healthcare transformation. Finally, the current study shows how a service systems' perspective can contribute toward integrated healthcare systems by understanding the needs of healthcare actors and by developing integrated services that balance conflicts between different actors and different health ecosystem levels.

The current paper starts by examining healthcare challenges, which is followed by examining the vision of people-centered, integrated and technology-enabled care. Then, the present paper examines the human-centered, transformative and service systems approaches of service design and how they can tackle healthcare challenges; this is done by providing illustrative cases based on previous research. The last section develops a research agenda that shows how service design can realize its potential for healthcare transformation.

Healthcare service system challenges

Healthcare services are currently undergoing dramatic changes. This section examines some key demographic and economic challenges, as well as healthcare system areas in need of profound transformations.

Demographic shifts

Changing demographics worldwide are putting pressures on healthcare systems (WHO, 2016). One of the most significant concerns is an increasing elderly population (European Commission, 2018; United Nations, 2019). At the same time, by 2030, it is estimated that 65% of the global population will be middle class (Kharas, 2017). These demographic shifts entail a change in health-related needs, with an increased prevalence of chronic diseases, mental health concerns and obesity, among others (Deloitte, 2019). Increased migration and the presence of more diverse ethnic groups in some regions can also contribute to stress on healthcare providers not accustomed to addressing this diversity (Ahmed and Foster, 2010).

Economic constraints

Healthcare spending is expected to continue growing at a staggering rate, and this may not be because of higher healthcare utilization but rather because of the increase in administrative and professional prices (Papanicolas *et al.*, 2018; Pozen and Cutler, 2010). The reasons for these burgeoning healthcare costs include greater pharmaceutical spending and elevated salaries for physicians and nurses (Papanicolas *et al.*, 2018); they also include administrative issues, namely inadequate knowledge regarding what costs will be covered by various complex reimbursement structures, and, most importantly, an inability to relate the costs of care to efficiency in the outcomes achieved (Kaplan and Porter, 2011). This situation has led to a push for healthcare systems to embrace a "value agenda" that is transparently focused on maximizing the cost-effectiveness of healthcare services (Porter and Lee, 2013). However, such a change to a value-driven healthcare system requires a sweeping transformation in the mindset of many healthcare actors to promote policy and procedural changes.

The lack of people-centered care

Traditionally, healthcare has focused on curing illnesses (i.e. *what is the matter with the patient*) (Deloitte, 2019). This approach was “repair-focused.” However, people-centered healthcare (WHO, 2009) implies going beyond curing illnesses toward considering and caring for other aspects of a person’s wellbeing (i.e. *what matters to a person*, e.g. a person’s physical, cognitive, emotional and contextual aspects). Although healthcare systems across the globe strive to achieve people-centered care, realizing this holistic approach has been hindered by numerous barriers. According to Sinaiko *et al.* (2019), the main barriers include 1) missing information and ways to collect it; 2) inadequate trust, respect and trustworthy exchange of information; 3) organizational culture, along with clinicians’ training, demographics and beliefs; and 4) the alignment of incentives and other factors from the external environment. These barriers call for a redesign of contemporary healthcare systems to allow for closer collaborations between healthcare beneficiaries and healthcare professionals.

Fragmentation in healthcare delivery

Service providers in healthcare industries have become increasingly fragmented into a bewildering array of subspecialties, external laboratories, insurance plan providers and competing practices. As an extreme example of this trend, one of the main challenges in the United States is the maze-like range of differing insurance plans coupled with the variations in costs for care and procedures. Advances in medicine that enhance the ability to carry out complex, intricate healthcare procedures can also lead to larger medical teams and more complicated workflows (Barjis, 2011). As a result, a serious problem in current healthcare systems is the potential for breakdowns in communication or coordination between the various units involved in treating a patient. The misalignment of incentives among various medical providers can also contribute to an inefficient allocation of resources, resulting in less-efficient medical care (Enthoven, 2009). Conscientious medical providers have responded to this situation with a call for more integrated practice units, but this approach has yet to be adopted in a widespread manner because of the current structural barriers that incentivize a fragmented and multisite model (Hwang *et al.*, 2013).

Technological paradigm shifts

The information era has resulted in the rise of new kinds of healthcare services that can improve record keeping and better integrate patient data across multiple providers; this has the potential to contribute to a more effective, personalized and patient-centric approach to healthcare (Beirão *et al.*, 2017; Bolton *et al.*, 2018; Pinho *et al.*, 2014). Additional emerging technologies are likely to take this process even further, leading toward new applications of artificial intelligence and machine learning for diagnostic purposes, along with robotic medical assistants, virtual reality medical visualization systems, online healthcare and a whole slate of similar products (Deloitte, 2019). In the most ideal case, these advances will improve the provision of services, alleviating some stress on healthcare professionals (Čaić *et al.*, 2018; Safavi and Dare, 2018). However, the introduction of new technology does not come without its risks or challenges. Automatization can feel alienating to patients, and it raises issues of control, safety, privacy and transparency (e.g. Who has access to the data gathered by such technologies?). Therefore, emerging technologies and data offer immense opportunities for healthcare, but the potential of new technology and data solutions remains largely unfulfilled (Kellermann and Jones, 2013).

Toward a vision of people-centered, integrated and technology-enabled healthcare

The vision of healthcare has evolved toward people-centered, integrated health service systems (WHO, 2016). People-centered health service is, at its core, putting people and

communities at the center of health systems and empowering people to take charge of their own health instead of being passive recipients of care. This means that a person cannot be reduced to a disease, and he or she has the capabilities and knowledge to manage his or her own health. At the same time, health professionals should seek to develop a relationship based on the respect of equals (Wigzell, 2017), resolving the dual-sided information asymmetry: the provider (physician) brings technical (clinical) knowledge and the customer (patient) brings personal knowledge (Black and Gallan, 2015).

Integrated health service systems should ensure that people receive a continuum of health promotion, diagnosis, treatment, rehabilitation and palliative care services across the different levels and sites of care for their entire lives (WHO, 2016). This demands a dramatic shift from the current practice of addressing problems after they have occurred and treating a patient's illness to promote wellbeing across the person's life and population health management (Kizer, 2015). Integrated health also requires fighting system fragmentation and promoting coordination and collaboration within the network of healthcare actors (Danaher and Gallan, 2016), as well as balancing individual and organizational needs with societal wellbeing and healthcare system viability (Beirão *et al.*, 2017). To this end, the creation of integrated practice units has been advocated as a way to provide the full cycle of care for a medical condition (Van Harten, 2018). However, although the formation of these units has occurred sporadically, integrated care has yet to be widely adopted given the multisite healthcare delivery organizational system and the lack of nationwide integrated care delivery systems (Porter *et al.*, 2013).

Finally, technology offers immense opportunities to enable people-centered, integrated care, which demands connected, intelligent information systems with adequate user interfaces. Patient-related technologies such as health apps, wearables, social robots, connected implants or online support communities offer accessible and efficient services that augment – or even replace – existing interactions with formal and informal healthcare providers. At the same time, technology facilitates collaboration among the stakeholders of the ecosystems, such as patients, professionals, insurances, hospitals, pharmacies, drug companies, policy makers and families (Pinho *et al.*, 2014). Real-time data exchange between back- and front-office systems, predictive data analytics and (semi)automated decision-making systems can pave the way to novel, more accessible and more affordable healthcare services.

Moving toward this vision of healthcare requires a profound health system transformation. Therefore, healthcare has been considered a relevant, impactful sector in need of urgent service innovation and also an area with high potential for academics to make significant research and societal contributions within (Berry and Bendapudi, 2007; Berry, 2019). This has stimulated a growing body of healthcare service research, but most of the literature has focused on explaining healthcare phenomena, with an emphasis on patient experiences and value cocreation. Although this understanding is crucial, evolving toward this vision of healthcare requires complementing explanatory research with more action-oriented approaches, such as service design, to create new service innovations that promote the desired transformation in health service systems (Patrício *et al.*, 2019).

Leveraging service design for healthcare transformation

Service design can catalyze transformation toward new healthcare, but a deeper understanding is needed regarding how this can be realized. This section examines three key complementary and mutually reinforcing service design approaches and how, together, they can boost health system transformation toward the new vision of healthcare, as depicted in Figure 1. These approaches are a human-centered and participatory design approach to collectively create new services based on a deep dive into people's experiences; a creative and

transformative approach that can help envision a move toward improved patient wellbeing; and a service systems approach for developing solutions that balance the different goals of multiple healthcare actors and pursue individual, organizational and societal wellbeing. These approaches are illustrated with examples of research projects that have contributed to both promoting healthcare transformation and advancing service design research.

Service design: a human-centered and participatory approach

Service design adopted a human-centered approach from its start, focusing on understanding human experiences and translating this understanding into a design of better customer journeys (Sangiorgi, 2009). Overall, service design offers deep qualitative insights into individual unique experiences, supporting the generation of service concepts that are inspired by the user’s contextual and holistic experiences (Yu and Sangiorgi, 2018). Service design develops emphatic knowledge by having direct contact with users and their contexts; this is facilitated by the application of design ethnography approaches (Blomberg et al., 1993), such as contextual interviews (Holtzblatt and Beyer, 2017) or empathy probes (Mattelmäki, 2005). Empathy is fundamental for developing solutions that are closer to people’s needs and abilities, supporting organizations to adopt an outside-in perspective in their innovation processes.

The fundamental role of people in services has also motivated the application of collaborative design approaches and methods, here originating from the field of participatory design (Greenbaum and Kyno, 1991; Schuler and Namioka, 1993). Participatory design is an evolving area of research and practice exploring effective modes that enable user participation during a design process. Based on this, service designers have been playing a facilitation role within codesign workshops (Trischler et al., 2018). Apart from reflecting on the cocreated nature of service, the engagement of people in codesign processes is also associated with empowerment and emancipation aims, favoring self-reflection and stimulating hope and imagination for the future (Sangiorgi, 2011). These dual dimensions of understanding and engaging people in the design for better service experiences are what qualifies the human-centeredness of service design (Meroni and Sangiorgi, 2011).

To redesign healthcare, there is a need for more consumer engagement and collaborative patient–provider relationships (Anderson et al., 2018). By bringing empathy and the study of human experiences to the fore, service design complements the original focus on the processes, pathways and systems found in healthcare improvement studies (Bate and Robert, 2007). By applying an experience-based approach, service design focuses on the role

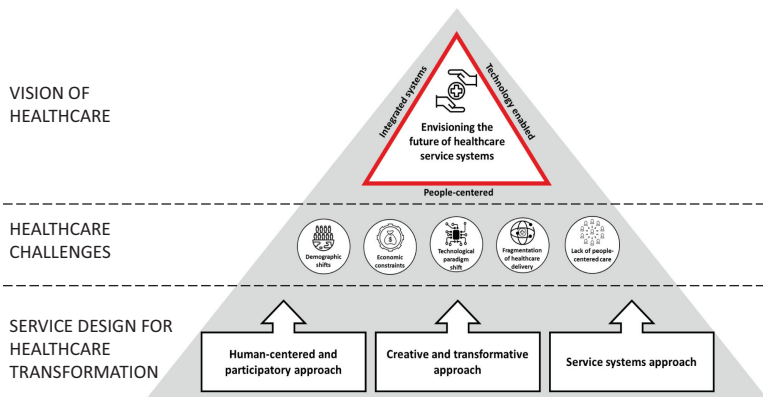


Figure 1. Service design for healthcare transformation towards people-centered, integrated, and technology enabled care

of emotions in healthcare recovery (Stacey and Tether, 2015); this helps healthcare staff and organizations empathize with patients and design services around their experiences, which is fundamental for imagining and implementing people-centered care (Tsianakas *et al.*, 2012).

Furthermore, service design has also contributed toward developing more inclusive, efficient and integrated care (Fisk *et al.*, 2018). Service design approaches and solutions have proved effective in engaging and codesigning with people who have different forms of disabilities and vulnerabilities, such as elderly people (Kälviäinen and Morelli, 2013), people with cognitive impairments (Carr, 2018), or those with mental health concerns (Sangiorgi *et al.*, 2019a). Previous studies show that codesign is particularly relevant in healthcare contexts where the patients are in a vulnerable position and may not perceive themselves as suitable participants (Hurley *et al.*, 2018). In general, patient engagement is highly valued in healthcare because it contributes to better health outcomes (Barello *et al.*, 2012). Codesign approaches contribute to but also go beyond patient engagement, involving users in the design and delivery of their service mobilizing their hidden resources for better healthcare (Palumbo, 2016).

Codesigning mental health services: Recovery.Net project in Italy

Recovery.Net is an Italian project funded by Fondazione Cariplo; its aim is to transform mental healthcare service systems toward community-based psychiatry, here intended as an integrated care system cocreated among different actors. This project is an example of people-centered and integrated care because Recovery.Net's recovery orientation toward mental healthcare challenges traditional patient–clinician roles and interactions (Phillips *et al.*, 2012). This project also balances institutional care with community-based support programs. To this end, it brings together the traditional biomedical model, which is based on interventions to overcome or reduce symptoms and disabilities, along with a recovery vision that gives increased importance to people's assets, choices and capabilities (Anthony, 1993). This is complemented by community-based psychiatry, which values individual and territorial resources to support rehabilitation paths, social inclusion and stigma reduction. These community resources are fundamental for patients' recovery journeys and also contribute to the establishment of a renewed idea of mental health as valuable for all society.

Service design has been involved in the project by facilitating collaborative design processes to establish innovation colabs in the project's three territories in the Lombardy region (Brescia, Mantova, and Castiglione delle Stiviere). These colabs aim to be the engines of this transformation, involving the codesign process with patients, relatives, professionals, associations and local actors. These three physical and social labs have been imagined as places where people meet in an equal manner to cocreate new forms of knowledge (e.g. Recovery College), initiatives (e.g. thematic readings, theater) and encounters (e.g. job placement support programs). Service design has focused on supporting this collaborative process, starting from the experience of patients and their relatives, considering people as resources and patients as experts in their recovery journeys. In these colabs, service design untaps the participants' ability to reconfigure existing resources to enhance their recovery journeys and to gradually transform the mental healthcare ecosystem (Vargo *et al.*, 2015).

Service design: a creative and transformative approach

Service design's key purpose is to enable change toward a better future. Although steering firms and users from "existing situations into preferred ones" (Simon, 1969) have been at the core of design for a long time, the environment in which this takes place has changed. Instead of relatively stable and predictable environments, today's rapid economic, political and technological developments prevent future states from being so easily prescribed and planned (Dadich and Doloswala, 2018; Orlikowski, 1996). Service design's creative, visual

and transformative approach can help envisioning new futures in the changing environment of healthcare.

A creative approach inherent to service design assists in finding novel approaches to people-centered care and how technology can act as an enabler of this. Service design involves creative problem solving by taking a process perspective when it comes to creativity. Rather than describing the creative output or idea, service design aims at creating novel and useful ideas for different domains (Amabile *et al.*, 1996). The creative cooperation between health service providers and the user is fertile ground for future health services (Steen *et al.*, 2011). Patients, nurses, family, medical specialists and other actors of the healthcare ecosystem contribute their knowledge and experience to understanding the service needs and developing new ideas.

Viewing people as a major source for innovation has been at the heart of more recent organizational change theories (e.g. situated change theory), which explain why people improvise and innovate and which have motivated modern working forms such as agile teams, holacracy or crowdsourcing (Mahr *et al.*, 2015). However, the sensitivity, criticality and abstractness of issues in healthcare demand adequate ways to obtain reliable input and ideas. A visual approach offers an important way to communicate and gain an understanding of the world (Bell and Davison, 2013) and to elicit latent needs and envision new future ideas. Emphasizing the collection, processing and articulation of visual information also accommodates the involvement of diverse users (Childers *et al.*, 1985). The active involvement of healthcare actors in the service design process also demands an iterative try out and validation of preliminary, potentially error-prone services. This action-oriented approach, as opposed to an explanatory one (Patrício *et al.*, 2019), manifests in continuous learning loops of experiencing a prototype, reflecting on the experience, interpreting the feedback and devising a new experience prototype for developing future services (Kolb, 1984).

Service design also acknowledges the complexity of human nature, aiming here at reaching more ambitious goals. Instead of developing single services driving traditional outcomes (e.g. satisfaction, loyalty), service design has increasingly focused on transforming organizational practices and institutional logics (Kurtmollaiev *et al.*, 2018), as well as on improving wellbeing and promoting social change (Alkire (née Nasr) *et al.*, 2020). The transformative role of service design enables the development of future healthcare systems that reconsider existing industry logics while aiming for far-reaching goals for the patient and the environment. Therefore, service design has been considered an essential mindset and tool for transformative service research in healthcare (Anderson *et al.*, 2018).

Envisioning robotic care through service design

Funded by the EU's Horizon 2020, this project aimed to tackle the challenges of aging populations by introducing an affordable robotic carer for elderly people. Robotic healthcare assistants (e.g. avatar nurses, care robots) have been commonly seen as a potential solution to address the lack of elderly care professionals, enhance the wellbeing of the elderly and reduce the caregiving burden of formal (professional) and informal (family and friends) caregivers (Robinson *et al.*, 2014). The main goal of this project was to develop a robotic carer that can connect the elderly to a virtual care network, personalize its behavior to the needs of seniors and support the elderly's daily tasks, ensuring their wellbeing and safety.

First, the project leveraged a service design creative approach to get the elderly discussing sensitive topics of care, isolation, independence and privacy, but also to make abstract concepts such as virtual networks and robots more understandable and relatable. The researchers conducted in-depth interviews with the elderly, employing a game-like, generative card activity, that is, contextual value network mapping (Čaić *et al.*, 2018). By mapping out their care networks using cards labeled "my daughter" or "my physician," the elderly created a visual materialization (Banks, 2001; Sanders and Stappers, 2008) of their

conceptualization of *care networks* and shared their current care experiences. For each care network, the project also leveraged the expertise of other identified network actors – both formal and informal caregivers. This collective creative process, which builds on the participation and resourcefulness of individuals, illuminated the informants' anticipations of the robot's cocreation/codestruction potential (Čaić *et al.*, 2018).

Second, the employed research approach did not focus only on the descriptive elements of *status quo* care-based networks but also on the envisioned *future scenarios* of robotized care. For example, the informants shared the ways in which their worries of robotized care could be alleviated through functional modifications (e.g. adding elements of physical assistance to the current robot prototype), promotion of high-tech and high-touch elderly care (e.g. not using robots to substitute invaluable human contact and emotional support) and ensuring transparent data management (e.g. clearly defined levels of access to data collected by the robot).

Third, this research project considered ways to create transformative changes in the lives of not only the elderly but also their formal and informal care providers. Through the network mapping activity, the informants were triggered to holistically reimagine future elderly care and redefine the institutionalized value cocreation practices, roles and rules. The informants thoroughly discussed whether the benefits of having the care robot might outweigh the costs. For example, the uncovered robot roles were found to both promote – but also hinder – the achievement of health-related outcomes, while the unintended consequences for wellbeing were detected both on the individual (e.g. decline of agency, loss of privacy, delusion) and collective (e.g. technology dependence, data sharing and management, lack of personalized care) levels.

Service design: a service systems approach

Service design has evolved to address the increasing complexity of service systems. Although initially focused on enhancing dyadic interactions between customers and service providers (Sangiorgi, 2009), service design has increasingly adopted a service systems approach to design services as enablers of value cocreating interactions in value networks and service ecosystems (Sangiorgi *et al.*, 2017). This approach can be particularly useful in addressing complex healthcare systems, which involve a wide range of actors, have conditions that the public finds undesirable and demand intervention by policy makers (Trischler and Charles, 2019).

Service design has strengthened its service systems approach by combining a service perspective with systems thinking. A service perspective grounded in service-dominant (S-D) logic (Vargo *et al.*, 2008) brings the focus to understanding how actors integrate resources to develop new value propositions to enable value cocreation among them (Frow *et al.*, 2014). This is important for people-centered care because service design approaches healthcare services as enablers of value cocreation between patient networks and healthcare provider networks, empowering patients as active cocreators of their health (McColl-Kennedy *et al.*, 2012).

Building upon service systems thinking (Maglio *et al.*, 2009), service design also seeks to innovate by envisioning new forms of value cocreation within service systems (Wetter-Edman *et al.*, 2014). This holistic and systems view can make a significant contribution to overcoming healthcare system fragmentation and moving toward integrated care. Although some key processes have been improved, such as the ease of finding physicians and scheduling through online portals, there are still large gaps, such as the early recognition of preventive healthcare problems, inadequate communication between multiple providers or the unavailability of personnel specifically devoted to enhancing the patient journey through the healthcare maze. A service design systemic approach to understanding and designing for the patient experience throughout the continuum of the healthcare journey across their lifetime and across a multitude of service providers can contribute to overcoming these challenges, hence moving toward integrated care.

Unraveling the interdependencies between healthcare actors is important for developing new services that improve the wellbeing for the overall network (Anderson *et al.*, 2013; Caić *et al.*, 2019b). Service design tools, such as actor network maps (Morelli and Tollestrup, 2007) or maps of multiactor activities, interactions, goals and potential conflicts (Patrício *et al.*, 2018), help in visualizing and understanding the complexity of these value networks. A multiactor, systemic approach of service design can contribute to overcome the current revenue-driven focus of healthcare systems, which are misaligned with the goals of enhancing patient health and preventing disease.

Complexity in healthcare systems is pronounced through the large number of actors and interactions, but also through their multilevel structure, from individuals to healthcare organizations, networks and the national healthcare system. Service design offers an integrative multilevel approach (Patrício *et al.*, 2011), enabling zooming in and out from designing interactions and touchpoints at the micro-level (Sangiorgi, 2009) to designing service concepts within value constellations (Patrício *et al.*, 2018) to designing for institutional change in service ecosystems (Vink *et al.*, 2019). This multilevel approach can help in addressing the interdependencies across healthcare system levels, creating solutions that balance individual, organizational, network and societal wellbeing (Beirão *et al.*, 2017).

A service systems approach to design the Portuguese National electronic health record

Electronic health records (EHRs) offer an integrated view of a patient's clinical history from different points of care, supporting continuing, quality and integrated healthcare while avoiding duplication of efforts and costs, such as repeated exams (McDonald *et al.*, 2014). However, the benefits of EHRs have frequently been hampered by a poor user experience and lack of user adoption, leading to the failure of EHRs in several countries (Nguyen *et al.*, 2014). To address these challenges, a four-year project involved a service design approach in the development of the Portuguese National EHR (Patrício *et al.*, 2018).

First, the exploration stage involved the study of goals and value cocreation activities of multiple healthcare actors (i.e. citizens, doctors, nurses and pharmacists). Second, mapping the health journey from birth to death from the citizen's perspective offered an integrated view of the continuum of multiple touchpoints within the healthcare system. This also enabled viewing the myriad of actors in the healthcare system through an actor network map, depicting their multiactor activities and interaction models; this was followed by a detailed examination of the relationships among the most relevant actors, their multiple goals and their potential conflicts (Patrício *et al.*, 2018).

This approach was key to designing the EHR as an enabler of value cocreating interactions among actors through shared health information and for developing a service solution that would balance the conflicting interests of different actors. Through a sense-making approach, different actors were brought together in participatory design workshops to jointly codesign the EHR for their specific profile and for the health system as a whole. In these participatory sessions, key decisions were made regarding the information available to citizens and healthcare professionals, here in an attempt to balance the potential conflicting goals of citizens' data privacy and doctors' access to data. For example, a new access auditing functionality was added to the EHR, enabling doctors to access patient information, but also enabling citizens to monitor who had access to their data.

A multilevel service design approach also enabled zooming in and out from an overall view of the EHR for the national healthcare system to how the EHR would be adapted to each actor. After designing the EHR at the healthcare system level, the design drilled down to specific service concepts and service architectures for citizens, doctors and nurses (Teixeira *et al.*, 2019b). This multilevel view was important for balancing wellbeing and system viability at the individual, organizational and health ecosystem levels. The system has been successfully adopted by citizens and healthcare professionals since its launch in 2012.

Developing a research agenda for service design for healthcare transformation

Healthcare service systems are facing dramatic challenges and need urgent innovation (Berry, 2019). However, moving toward this new vision of care requires a profound transformation of healthcare systems, from changing the mindsets of people and healthcare practitioners to integrating the myriad of healthcare providers for continuum of care to effectively leveraging technology for people-centered healthcare innovation.

The previous section shows how service design approaches can contribute to healthcare transformation. However, this initial research also opens new opportunities for service design in healthcare. Building on this exploration, this section develops a research agenda for untapping the potential of a service design human-centered, transformative and service systems approach, positioning it as a catalyzer of healthcare transformation, as summarized in Table 1. Finally, this section also explores how service design research should advance in terms of theoretical foundations, multidisciplinary bridges and new methods and tools to address healthcare challenges.

Using a service design human-centered and codesign approach to leverage technology and empower people-centered care

Developing service design capabilities in healthcare for an innovation culture toward people-centered care: Healthcare organizations have started to experiment with new innovation approaches, such as health or design labs, as a means to creatively address complex health challenges. Here, service design has been introduced as a way to support health organizations to leverage people-centered care, as well as to cocreate new services with a wide array of local actors. Despite this growing phenomenon, the impact of developing design capabilities to foster cultural change in healthcare organizations has not been studied, and challenges exist regarding how to scale up initial local experimentations. Therefore, service design research should go beyond its application in specific healthcare projects, working toward developing

Using a service design human-centered and co-design approach to leverage technology and empower people-centered care

(1) Developing service design capabilities in healthcare for an innovation culture toward people-centered care (2) Evolving service design to leverage and embed emerging technologies as part of a human-centered view of healthcare (3) Using human-centered design and co-design to enhance equity and promote service access in healthcare

Leveraging a service design creative and transformative approach to envision new healthcare futures toward wellbeing

(1) Leveraging service design creative approach for developing future healthcare services where issues are life critical, future is abstract and people might not have agency (2) Using service design to promote a transformative healthcare approach toward wellbeing (3) Using a creative approach of service design to leverage data-driven technology for healthcare

Adopting a service design service systems perspective for integrated care

(1) Using service design to create integrated, balanced solutions to address multiple goals of different actors for an integrated patient journey (2) Designing new systemic solutions to evolve towards a value based agenda of healthcare (3) Defining and implementing health public policy through service design

Advancing service design to address healthcare challenges

(1) Strengthening service design principles and theoretical foundations (2) Establishing new interdisciplinary bridges between service design and healthcare research (3) Evolving service design methods and tools

Table 1.
Future research
directions for
leveraging service
design for healthcare
transformation

service design capabilities in healthcare organizations for a continued and long-term effort to embed a human-centered and participatory mindset.

Evolving service design to leverage and embed emerging technologies as part of a human-centered view of healthcare: Service design has been mostly focused on experience-based approaches, with very few studies on how emerging technologies can be applied to support healthcare innovation. It is now urgently needed for service design to explore both theoretical frameworks and action research projects to question how a human-centered design approach can balance the pervasive nature of health technologies (Röcker *et al.*, 2014). To this end, service design research should integrate research from science and technology studies to inform approaches that can digitize healthcare. Studies are needed on how to design for the ethical, equitable and democratic use of the wide range of data developed within services for health, here with a focus on people's needs and rights. Furthermore, adopting emerging technologies, such as augmented and virtual reality, should also complement service design approaches for better evaluating human experiences within current and future solutions.

Using human-centered design and codesign to enhance equity and promote service access in healthcare: Service design should enhance its human-centered design approach to better balance and integrate experiential and lay knowledge and resources that can come together when aiming for cocreation in healthcare innovation. For example, experience-based design approaches have been questioned for their inability to engage with patient associations and social movements (Williamson, 2010) or to challenge power relations in healthcare settings (Farr, 2017). Future research is needed to develop approaches and core design principles that can better balance top-down and bottom-up change processes, leveraging the role of service design in patient-led and collective intelligence approaches to healthcare.

Leveraging service design as a creative and transformative approach to envision new healthcare futures toward wellbeing

Leveraging service design as a creative approach for developing healthcare services where issues are life critical, the future is abstract and people might not have agency: Service design embraces a collective, creative approach where users are viewed as experts with unique knowledge and can codesign new services. In a healthcare setting, topics are often sensitive, issues are difficult to express or people have limited cognitive abilities, which hinders them from taking an active part and sharing their knowledge. Future research might tap into how these hindrances can be considered through service design, namely what kinds of service design methods and tools can be used. Research using visual service design approaches, such as design probes and design games (Brandt, 2006), can provide a deeper understanding of these sensitive and abstract health-related topics, while involving healthcare staff and patients' family members in value network mappings (Čaić *et al.*, 2019a) can shed new light on the tensions and conflicts among healthcare actors.

Using service design to promote a transformative healthcare approach toward wellbeing: To embrace human diversity, service design needs to continue developing its inclusive approaches to ensure that there is an equal opportunity for people with diverse demographic backgrounds, social positions, and other social determinants to achieve their full health potential. Fostering service design for inclusivity calls for personalized approaches in healthcare ideation, and in the development and delivery phases; doing so can contribute to cultural change based on inclusive service system design (Previte and Robertson, 2019). For example, increased healthcare automatization may imply ensuring smooth processes for people with varying digital skills and literacy levels. Constantly reflecting on transformative processes, on the consequences for the involved healthcare actors and on a transformative culture is thus necessary (Sangiorgi, 2011). Nurturing a service design mindset and fostering the skills and dynamic competencies among the healthcare personnel and management are

necessary for the emergence and embeddedness of transformative design cultures in healthcare.

Using a creative approach of service design to leverage data-driven technology for healthcare: Patient health-related data are becoming a driving mechanism of healthcare transformation (Accenture, 2018). Because emerging technologies (e.g. AI, machine learning, robotics) heavily rely on customer data, there is a growing concern regarding algorithmic biases, the absence of ethical regulations and the unintended consequences of the utilization of health-related data. Thus, service design research needs to explore ways to contribute to data-driven healthcare and to advance the body of knowledge on data-related threats, such as patient discrimination, data sovereignty and compromised privacy. On the one hand, there is a need for greater data integration – combining clinical data, self-reported data (e.g. weight data), personal wellness data (e.g. data tracked through wearables, including steps) and the social determinants of health to better address heterogeneous health-related needs (Accenture, 2018). On the other hand, there is a need for designing protocols to decrease data security uncertainties, hence ensuring greater data transparency. Patient trust can be achieved through secure digital dialog platforms and block-chain technologies, but also through a strong focus on a human touch and warmth-related human capabilities. To achieve the transformative force of service design, it is necessary to have policy makers on board, involving them in the design process through democratic and participatory service design approaches.

Adopting a service design service systems perspective for integrated care

Using service design to create integrated, balanced solutions to address the multiple goals of different healthcare actors for an integrated patient journey: Healthcare systems have become increasingly fragmented, breaking apart into complex networks of subspecialties, insurance plans and competing practices. Therefore, healthcare is in urgent need of innovation toward integrated care and offers relevant research opportunities to explore a patient's journey view. This understanding of patient navigation and experiences across the current myriad of healthcare and insurance providers is key for improving healthcare systems and moving them toward integrated care. On the other hand, integrated care also requires addressing the needs and balancing the different goals of multiple network actors, such as public and private practices. Healthcare, therefore, offers research opportunities to use a service design systemic approach to understand the different and interconnected activities and goals of multiple healthcare actors, hence collaboratively cocreating balanced and aligned solutions, and fostering a sense of ownership by involving the different healthcare actors in codesign processes (Patrício *et al.*, 2019). Furthermore, finding novel ways to investigate and resolve trade-offs between the individual and collective wellbeing calls for a multidisciplinary approach, leveraging the competences of service designers, medical researchers, public health specialists and technology developers, among others (Čaić *et al.*, 2019a).

Designing new systemic solutions to evolve toward a value-based agenda of healthcare: Value-based care is considered critical for improving people's health worldwide and controlling runaway healthcare costs, where value is defined as the outcomes that matter to patients and the costs required to achieve those outcomes (Porter and Lee, 2013). This has resulted in a push for healthcare systems and all their stakeholders to embrace the "value agenda" – an overarching goal to maximize the value of healthcare to patients. However, the change to a value-driven healthcare system that focuses on patients requires a sweeping transformation among organizations, industry and government. Therefore, service design can contribute to building this value agenda of healthcare. The value-based care approach lends itself to a multitude of service design approaches that can help address the optimacy of healthcare delivery to the patient and the multiple conflicting goals in an integrated way. Research on value-based care approaches may not only involve addressing all aspects of the

care delivery system that are important to the patient, such as access and cost, but also the aspects that address the humanizing aspects of care (Todres *et al.*, 2009).

Defining and implementing health public policy through service design: Service design, when seen through participatory, sense-making approaches, can offer contributions to designing healthcare public policy. Service design can greatly benefit from joining forces with health policy toward supporting the design of governance structures that establish clear clinical goals and oversee the implementation of policies for coordinating care across the continuum of health services (Kizer, 2015). Indeed, service design can support the development of policy changes by helping to frame the scope of the problem, collectively envisioning new solutions through participatory approaches and iteratively testing and improving the effectiveness of policy interventions. Value-based programs appear to be the basis of broad healthcare policy going forward, and their implementation and entrenchment using principles of service design offers great promise to improve their effectiveness. The example of Portugal's EHR highlights how joining service design for creating the service and health policy for defining the vision, outlining priorities and the expected roles of different groups can build the basis for a successful transformation.

Advancing service design to address healthcare challenges

The previous sections explore future research on the application of service design to address healthcare challenges. However, leveraging the potential of research in healthcare also requires service design to evolve as a research area, strengthening its foundations, establishing new bridges with other disciplines and developing new methods and tools.

Strengthening service design principles and theoretical foundations: Service design builds upon multiple disciplines from service research and design (Joly *et al.*, 2019) and is grounded in systems theory and S-D logic (Wetter-Edman *et al.*, 2014). However, addressing complex health challenges requires strengthening service design's systems thinking, shifting the perspective from parts to the whole, from objects to relationships, from structure to processes and from measuring to mapping (Vargo *et al.*, 2017). Because service design addresses the complex context of healthcare with a myriad of actors, misalignments and conflicting goals, service design approaches may need to be complemented with new principles of designing for interdependence, participation and emergence (Sangiorgi *et al.*, 2017), where designers increasingly play a facilitating role and are enablers of institutional change (Vink *et al.*, 2019). Exploring new service design principles and the new roles of service design in transformational healthcare change can contribute not only toward tackling healthcare challenges but also to evolving service design as a research area.

Establishing new interdisciplinary bridges between service design and healthcare research: Exploring the healthcare territory with service design also entails establishing new bridges, understanding new contexts and languages and collaborating with different new fields. For example, dedicated interdisciplinary studies and experimentations are needed on how to complement the traditional approaches to change, which have narrowly focused on quality improvement and patient safety, with service design human-centered approaches. At the same time, future research can explore how service design can balance creative skills with the capabilities to adopt, implement, disseminate and scale up solutions, as well as achieving greater rigor and better outcome measurements in the evaluation of innovation (Stome *et al.*, 2019).

An additional and promising bridge is between service design and evidence-based design (EBD). The EBD approach toward design relies on the careful empirical study of human responses and outcomes to inform design decisions (Cama, 2009; Hamilton and Watkins, 2008). Indeed, EBD practice has become particularly influential in healthcare settings, where it has been associated with improvements in the quality of care, greater patient satisfaction and a decrease in the number of medical errors (Ulrich *et al.*, 2010). Therefore, future research

should explore how to conceive of healthcare facilities based on EBD thinking and implementation, complemented by input from key stakeholders such as patients, families and clinicians (Berry *et al.*, 2020). Integrating EBD with service design could potentially incorporate the best available information from behavioral research, ultimately improving the health outcomes, economic performance, productivity and customer experience in healthcare settings.

Evolving service design methods and tools: Finally, service design has evolved regarding its methods and tools, better addressing new service contexts, such as technology-enabled services (Čaić *et al.*, 2018; Teixeira *et al.*, 2017) or its ability to examine key service design concepts and tools, such as customer journey mapping (Følstad and Kvale, 2018). However, promoting healthcare transformation may require the development of dedicated service design methods and tools that address the specific challenges of healthcare, namely the methods for integrating data-driven service innovation opportunities with the human-centered approaches of service design. To this end, design research and design science research can provide useful support, ensuring relevance and rigor in the development of new design methods (Teixeira *et al.*, 2019a). Moreover, going beyond applying service design in specific healthcare projects and moving to creating a service design, human-centered, and participation innovation culture requires new approaches to develop the design capabilities in organizations.

Overall, healthcare is in need of and offers immense opportunities for service design research, with a high potential for significant research and societal contributions. Embracing these challenges opens new ground for leveraging and extending the application of service design in healthcare, but it also requires advances in the concept of service design itself. We hope this framework and research directions encourage service researchers to embrace these challenges, helping them leverage service design for healthcare transformation.

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