Exploring patient-centeredness ecosystems: a collaborative approach to expand the service design horizon

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Abstract

The healthcare sector is one of the areas in which service design can make an important contribution. This paper presents the ongoing results of joint research between Politecnico di Milano and Northeastern University, which aims to investigate patient-centered solutions and processes through a systemic perspective. In particular, the article proposes a study on the definitional evolution of the term patient-centeredness and a methodological approach to investigate patient-centricity through different levels that include solutions, the system of actors involved, and the role of patients. 6 exemplary cases from Italy and the USA are introduced to convey the complexity of the solutions and the related system, as well as the similarities and differences between the two contexts. The paper concludes by outlining the subsequent developments of the research, together with the criticalities that emerged, contributing to the ongoing debate on the transformative role of service design in complex service systems.

Keywords: *Patient Centeredness, Service Design, Healthcare Ecosystems, Co-design, User Innovation*

Patient-centeredness and the challenge

Healthcare is a complex ecosystem in which public and private services are entangled. In this ecosystem, the role of health providers, patients, and communities increasingly demands open participation in more collaborative journeys (NESTA, 2018). Emerging technologies, demographic and environmental changes, and recent

awareness of challenges in predicting emergency risk on a local and global scale have contributed to the evolution of the healthcare system. In this scenario, the importance of rapidly innovating products and services and the crucial roles of patients are at the center of the policy agenda. In response to the rapid change, new solutions are emerging regarding data monitoring, community initiatives, etc., fostering a patient-centric perspective.

Organizations such as the World Health Organization (2016) and the OECD Health Ministerial Meeting (2017) propose the essentiality of patient-centeredness. However, there are varying perspectives on the meaning of patient-centeredness. There are several competing definitions of what user-centered, patient-centered, person-centered, or family-centered mean when we develop product-service-system solutions. The lack of a clear definition, including that of ‘patient-centered’ and/or ‘patient-driven’ solutions, makes the two terms overlap without detailing the different roles that patients and caregivers might have in the process. For example, patients can lead the process as ideators, designers, and implementers; they can be co-creators with communities of experts and stakeholders or participate as evaluators of processes and solutions. Furthermore, patients' involvement primarily concerns the final solution or their participation in co-design and co-creation processes. Therefore, how might we explore 1) the processes of actors and systems, 2) the service ecosystem’s changes, and 3) the outcome of actors' relationships beyond service solutions, when analyzing different contexts and actors that have multiple various interests and cultures of service design, collaborative processes and patient-centered approaches?

Why exploring patient-centeredness might expand the service horizon

Service is one of the areas that has been mostly impacted by the changes brought by the COVID-19 pandemic, and especially so is the healthcare service industry. Patient-centricity can expand the horizon of healthcare service by reimagining the role for individuals and communities in the prevention, cure, and care journey through emancipatory processes. In this framework, the relationships and the power balance between the different players can vary according to different contexts in which health professionals, institutions, organizations, professionals, and laypeople work together. It will foster innovation in the product-services delivered, in the organizational processes, in the technologies adopted, in the procedures, and in the norms and values that organize and inform these systems.

The protagonists of such innovation journeys are not only experts but also common people, caregivers, and local communities. The definition given by the World Health Organization (2016) considers people-centered care as:

> "… an approach to care that consciously adopts individuals', carers', families' and communities' perspectives as participants in, and beneficiaries of, trusted health systems that are organized around the comprehensive needs of people rather than individual diseases, and respects social preferences. People-centered care also requires that patients have the education and support they need to make decisions and participate in their own care and that carers can attain maximal function within a supportive working environment. People-centered care is broader than patient and person-centered care, encompassing not only clinical encounters, but also including attention to the health of people in their communities and their crucial role in shaping health policy and health services" (p.2).

In the scenario of fast-growing demand for participation in the healthcare system, NESTA (2018) outlines different strategies of patient innovation: behavioral changes to prevent chronic diseases, self-management, and monitoring; supporting the autonomy of people with disabilities; enabling the creation of new spaces and places centered on the users' needs; fostering new relationships between doctors and patients and improving the services accessibility and communities' mutual support. All these strategies embrace the idea of a collaborative journey and value co-creation between the different actors involved in the service ecosystem. This entails that prevention and treatment are driven and supported by a wider community of actors and infrastructures, expanding the care journey outside hospitals and clinics, reaching homes and workplaces.

Leveraging service design in the patient-centered scenario

Concurrently, the global pandemic has highlighted the essential role of design in integrating technological and social innovations with human-centered design approaches in developing patient centered product-service systems. In a multi-authored book edited by Nolte et al., (2020) the various authors explore how approaches to patient-centeredness are referred to and outline different levels and degrees of participation in the design, implementation, or evaluation of healthcare solutions together with long-term visions and systemic changes in services.

The role of designers and, more precisely, service designers become increasingly important when referring to patient-centered healthcare (Rowe et al., 2020). Indeed,

the contribution expands from isolated solutions and interfaces to organizational processes — new ways of relating between actors, even to the design of new ecosystems (Vink et al., 2020). In addition, service designers have successfully incorporated human-centered approaches in service development and delivery, broadening service design boundaries and their impact (Penin, 2018; Stickdorn et al., 2018; Polaine et al., 2013). In recent years, the evolution of service design disciplines has emphasized integrating the systemic dimension that implies a multi-actor and multi-scale perspective (Patrício et al.,2018; Sangiorgi, 2009; Wetter-Edman et al. 2014, Maffei et al., 2022). Recently, Vink et al. (2020) outlined and defined a service design ecosystem perspective that goes beyond a linear process of service design. The authors depict a contribution in which design interventions embedded circular loops integrating organizational, relational, and strategic aspects, the results of which are not fully predictable. From a design point of view, this emphasizes the need to consider end users as part of a complex system of formal and informal relationships. Service design is then considered a transformative approach for innovating complex systems (Sangiorgi et al., 2017), entailing more collaborative actions within stakeholders' system balancing social wellbeing and solutions' viability (Patricio et al., 2020). A participatory stakeholder approach contributes in implementing successful solutions (digital health devices) and enables a better understanding of the needs and requirements of professionals and patients, facilitating project coherence (Sanz et al. 2021).

In the next paragraphs, the first reflections arising from a joint initiative between two research groups of the Politecnico di Milano (Milan) and Northeastern University (Boston) on mapping patient-centered and people-centered initiatives in the healthcare sector will be shared. This process first begins to understand how the concept of people-centricity in healthcare is interpreted, what are the updated reflections on these issues in the service design and how current practices can be analyzed through a model that considers patients as dynamic players who act in a large and complex system of actors who contribute, with different roles, to design, develop and implement the service solution. The aim is, therefore, to reflect on how the disciplinary boundaries of service design are widened (or could be widened) when considering the centrality of the patient from a system perspective.

Patient-centeredness in Lombardy and Boston: a joint research initiative

This paper showcases the preliminary findings from the collaboration and represents an attempt to investigate how design, and in particular service design, is contributing to the diffusion and development of patient-centric solutions. The initiative is linked to a previous project called “MakeToCare” which started in 2017 and was developed by Polifactory at Politecnico di Milano, with Sanofi Genzyme and Fondazione Politecnico di Milano, in Milan, Italy. The main goal was to build a theoretical framework and a methodological approach to identify, map, and analyze innovative product-service solutions to illustrate the emergence of the patient innovation phenomenon and its transformative impact on the Italian healthcare system. The research involved patients, their associations, caregivers, and varied healthcare providers. It shaped an eco-systemic vision of the actors’ system and collaboration networks, highlighting an emergent, holistic perspective. The final interpretive model, the MakeToCare Ecosystem, visualizes and describes the materialization process of the patient innovation solutions and its characteristic process (the MakeToCare Ladder), describing the four main stages of the development of healthcare products-services.

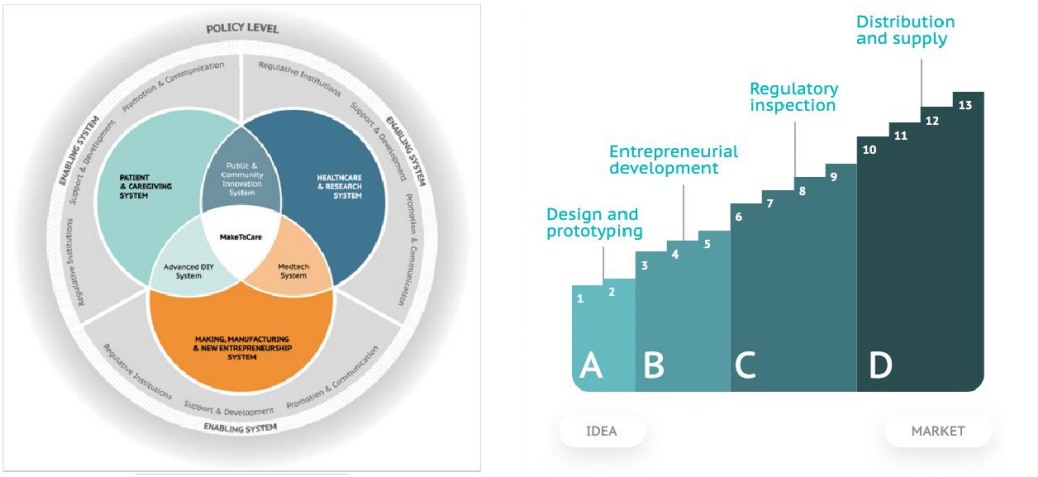

Figure 1. MakeToCare research models: the Ecosystem and the Ladder.

Based on the Make to Care structure, a collaborative research platform with Center for Design at Northeastern University in Boston, Massachusetts, started in 2022. The two academic institutions developed a shared common research platform focused on exploring the emerging role of patients, caregivers, design firms, research and public

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institutions, enterprises, and other healthcare system actors/organizations in developing service design cases, projects, and processes in Milan and Boston. The two teams are building a collaborative research agenda based on a two-folded activities program: (i) a systematic literature review of patient-centeredness definitions and evolution; (ii) a search and inquiry activity focused upon the collection of exemplary service design patient-centered projects, tools and processes in the Milan/Lombardy and Boston/Massachusetts areas. The first step develops a systematic exploration of the range of service design initiatives that can empower patients, identifying potential opportunities to humanize healthcare and developing future strategies for designers to ensure patient autonomy and dignity in healthcare processes and ecology. Preliminary findings include a meaningful definition of patient-centeredness, a map and analysis of the case studies, and a description of different service-design patient-centricity within the ecosystems.

Through this research, we aim to uncover if the previous strategies are a reality for fostering the care journey beyond hospitals. As mentioned in paragraph 1.1, this work is both iterative and ongoing and is helping the search for and identification of cases in healthcare that include, but are not limited to, a set of designed artifacts understood as tools, documents, actors, services, and experiences – claiming to have been designed with a patient-centered approach. Our aim is to explore and lay out the complex structure of the healthcare ecosystem and its interconnected network of relationships by mapping the extant reality: the actors involved and the collaborative processes they develop; how these processes change services by making them patient-centered; the results these processes produce not only in terms of service innovation but also in terms of (multi)cultural enrichment for service design.

Patient-centeredness in literature

Patient-centeredness in the medical field began from the need to understand the patient's unique circumstances and serve as a health advisor in a therapeutic alliance. These early perspectives of patient-centeredness focused on identifying ways for the patient to regain and maintain their health rather than identifying and treating the disease (Brackenbury, 1935). The term patient-centered care was drawn from psychotherapy and differentiated from illness-focused care (Balint, 1969), yet it wasn’t until the development of user-centered software design, which focuses on shifting the burden from the user to the system, as well as outlining user participation in the creation of the system (Sanz et al., 2021), that patient-centeredness in the modern sense began to take root (Kling, 1977). The previous shift led to patient/client/family/person/relationship-centered approaches in healthcare.

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A significant advent was the inclusion of patient-centered care in the 6 aims for the healthcare system by the Institute of Medicine: care that is safe, timely, effective, efficient, equitable, and patient-centered (Institute of Medicine (US) Committee on Quality of Healthcare in America, 2001). After this inclusion, patient-centeredness eclipsed other kinds of centeredness in healthcare research; there has been a plethora of research trying to define what exactly patient-centeredness is as well as the inclusion of the term across medical institutions. There have been efforts to objectively measure patient-centeredness, however, the specificity and simplification of concepts are necessary for meaningful, reliable measurements (Mead, 2002).

We conducted a systematic review of PubMed for systematic reviews from 2012 to 2022 that defined Patient-Centeredness. We searched the Title and Abstract for the following terms: patient-centered AND (definitions OR definition OR values OR value OR theme OR themes). Only papers published in English were included, this returned 185 papers. From this one duplicate was eliminated, and the reading of abstracts excluded 8 more for not meeting the specified search criteria. As secondary elimination criteria, we excluded papers that did not focus on patient-centered values within their review, as well as papers that did not mention at least two of the values previously identified by an earlier literature review; these criteria eliminated 63 papers, leaving 113 qualified for inclusion. Patient-centeredness was most defined as containing the following elements: 1) listening to patients 2) patient perspective 3) taking a holistic view of the patient 4) creating an individualized care plan 5) patient education 6) patient empowerment 7) shared decision-making 8) continuity of care 9) coordination between providers 10) emotional and physical comfort in a supportive environment. In practice, each of these imperatives comes with its own set of challenges and proposed solutions. For example, the main barrier to listening to patients was a perceived lack of time on the part of clinicians due to feelings of overwork. Feelings of time pressure reduce the physician’s motivation to ask questions and discuss issues, patients are also less likely to want to take the time of clinicians that seem very hurried (Joseph-Williams, Elwyn, & Edwards, 2014).

Taking a holistic view of the patient goes beyond using the patient's perspective and into working within a framework that can adapt a care plan that considers the patient’s cultural communities and views on health. For instance, rural areas tend to view any reliance on the healthcare system as being unhealthy. (Gessert et al., 2015) in addition, failing to consider the unique qualities that make up a patient’s identity can lead to anxiety in patients and worse outcomes of care. (Lisy, Peters, Schofield, & Jefford, 2018).

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To take one example, in shared decision-making, one challenge contributing to this perception of time-poverty is a lengthy process of manual data entry of patient preferences into digital decision-support tools. Skipping structured decision-support tools can lead to physicians relying on their own intuition to fill in the gaps in their knowledge of patients. This can have disastrous results, especially in surgical contexts, where 10%-15% of postoperative autopsies reveal that the death in surgery was caused by a bad judgment call (Loftus et al., 2020). Therefore, to be patient-centered, considerations for the physicians' experience should be made.

Another example of considering the patient's perspective is the creation of individualized care plans. These individualized care plans, however, face resistance in the form of administrative rigidity, forcing practitioners to find a balance between organizational needs and values and those of the patient (Olsen, Bergland, Debesay, Bye, & Langaas, 2019). In another example, patient education is viewed as a high priority, with patients wanting simple language to explain their condition and the reasoning behind practitioner suggestions (O'Keeffe et al., 2016). Regarding continuity of care and coordination between providers, elderly patients tend to rate it as their highest medical priority and they see the same physician every appointment, priority younger patients also share. When a patient runs into problems due to a lack of coordination in one domain, it normally affects others. (Heip, Van Hecke, Malfait, Van Biesen, & Eeckloo, 2022).

Exploring patient-centered practices in local care service ecosystems: the case research methodology

Exploring patient-centeredness means framing the patients' roles, needs, and motivations by adopting a holistic perspective in observing the care service system. It means mapping not only the solutions (i.e., product-services), but also understanding the practices, processes, and tools to develop them, identifying the actors who designed and implemented them, and getting to know their systems of relationships (economic, social, ...). The mapping of patient-centeredness in care service ecosystems combines the MakeToCare research model with the most relevant elements of knowledge emerging from the literature review. The result is the definition of three main elements for analyzing case studies:

- types of artifacts constituting the system-product-service solution for care (Artifacts' typology). This maps tangible artifacts such as products, devices, equipment, and touchpoints to deliver or develop the service, intangible artifacts such as software or apps to enable functions, performance, and uses

of the service, and knowledge artifacts such as methods or procedures/protocols that aid patient participation in care processes;
- system of actors that designed and implemented the solution (Actors' coalition). This identifies a network, and agreements between the actors involved in the co-creation and co-design processes;
- presence and role of the patient in implementing the solution (Patients' role). This defines the patient's involvement in the co-creation, co-design, and co-production stages.

These three elements have been adopted to analyze and describe the patient-centric solutions and related ecosystems within the city of Milan, its metropolitan area, and the Lombardy region (Italy), and Boston (USA).

Exemplar cases of patient-centeredness within the Milan care service ecosystems

Within the Milanese urban area, 25 cases relating to projects, initiatives, and solutions of product-service systems were collected. 5 out of them belong to tangible artifacts, 11 can be considered intangible artifacts, 14 are knowledge artifacts, and 5 out of them are considered two categories. In 9 out of 25 cases, we might find an explicit and well-identifiable relationship with the patient. The relationship is mapped in the other 16 out of 25 but not evident or described in depth. 20 out of 25 cases deal with user participation, mainly concerning the engagement phase. 8 out of 25 cases testify to a higher degree of involvement in co-creation and co-design activities (co-production in one case).

The actors' systems activating and providing services are heterogeneous: hospitals, third sector organizations, universities and research centers, large pharma companies, med-tech and e-health start-ups, Fab Labs, and makerspaces. In two-thirds of the mapped service cases (17 out of 25), services are developed by actors' coalitions through large alliances or partnerships. To highlight the characteristic patient-centeredness we present three cases describing emergent perspectives in patient-centricity: *Tech Lab, Grace Lab, and Alzheimer Lab.*

The Tech Lab and the caregiving system of Spazio Vita Niguarda Onlus (spaziovitaniguarda.it). Tech Lab is a lab created in 2020 by Spazio Vita Niguarda Onlus, a cooperative founded in 2013 by two voluntary associations active in the Niguarda hospital in Milan developing protocols for clinical-rehabilitation and social inclusion of patients with spinal cord injury. The Lab is supported by voluntary

associations, hospitals, municipalities, regional government, universities, bank foundations, hi-tech companies and companies specializing in healthcare supplies. Tech Lab operates as an incubator of ideas and provider of services, training, and activities in the field of technological innovation applied to disabilities. Tech Lab has a multidisciplinary team that designs tools and organizes initiatives to improve the quality and autonomy of people with spinal cord injury. In addition, there is an assessment and identification service for computer aids and software for communication and the use of these devices in the home, social, school and work environments. It is equipped with an in-house Fab Lab to co-design and materialize customized aids for different patient needs.

Piazza Grace and Grace Lab by Genera Onlus (generaonlus.it). Piazza Grace is the first "Alzheimer's Village" in the Metropolitan City of Milan. It is an experimental project developed by Genera Onlus, a social cooperative operating in Milan and the hinterland specialized in the design and development of co-housing, social housing, educational, social-assistance, and social-health services for Alzheimer's patients, their families, and caregivers. Created in 2018, Grace Lab is a research lab working for Piazza Grace which combines the design teams of Genera and Lab.I.R.Int, a research group of the Department of Design - Politecnico di Milano specializing in interior design (Biamonti, 2018). Thanks to its interdisciplinary group of researchers, designers, operators, and caregivers, Grace Lab experiments with environments and tools for therapeutic habitats. Within the Lab, prototypes of products, environmental solutions, and services designed for Piazza Grace environments are developed and tested. The Piazza Grace care services and their touchpoints are con to meet the safety and inclusion needs of the residents of the Village and to integrate non-invasively into the customizable therapeutic habitats.

Alzheimer Lab by Fondazione Sacra Famiglia (sacrafamiglia.org). Alzheimer Lab is a service developed by Fondazione Sacra Famiglia (a non-profit organization founded in 1896) with the financial support of Fondazione di Comunità Milano to support Alzheimer's sufferers and their families. The initiative, born during the pandemic, concerns the creation of a media channel dedicated to the families of Alzheimer's patients, which has published one hundred videos explaining various rehabilitation exercises. The lessons, which can be done remotely, focus on physical activities, stimulation of skills, cognitive functions, and multitasking abilities. The service also includes support provided by a care center psychologist to family caregivers. The Covid emergency necessitated a design with information content that could be easily communicated to a population of family caregivers, providing them with both guidance to support patients at home and adequate support to cope with the stress

of living with Alzheimer's patients under challenging conditions. This is an example of an ecosystem of resilient patient-centered services enabled by digital transformation.

Exemplar cases of patient-centeredness within the Boston care service ecosystems

Northeastern University reviewed cases from existing projects to distil concepts that convey patient-centeredness as reflected in designs for care/cure. The data set includes 70 cases/projects in the greater Boston area; 6 of them are tangible artifacts, and 64 cases were intangible artifacts, 19 of which were knowledge artifacts. Only 8 cases indicated a reliance on patient perspectives, with 2 cases specifying the sharing of power and responsibility between the patient and provider. Compared to Milan, the Boston ecosystem emphasized services, programs, applications, and care models, contributing to a greater focus on the values that emerged from projects identified as patient-centered. Thus, we conducted a thematic analysis to understand the concepts of patient-centeredness as represented in the artifacts.

The most prominent theme that emerged in 20 cases was *early detection and minimizing preventable harm* amongst patients. Further, designs to *track biostatistics in real-time* and *extend digital reach* allow physicians the opportunity to make timely interventions and mitigate patient risks. Digitizing the care management experience aspires to afford a shift from intermittent to *continuous care,* (care in between traditional visits) which was espoused to be a priority in 15 cases. Such digitization helps to promote another critical component noted in the cases, *coordination, and collaboration* between the entirety of the patient's care team to provide holistic care and ensure a positive overall patient and provider experience. *Personalized patient care* that ideally reflects patient wants, needs, and preferences, is another theme that occurred in 17 cases. Lastly, the *empowerment of patient*s to actively participate in their own care and make informed decisions for their health was also mentioned in 16 cases. For this paper, we present four exemplary cases that elicit the values mentioned above:

Invenix Infusion System (ivenix.com). The Invenix Infusion System was designed by Invenix, a medical technology company, with the goal of eliminating infusion-related harm. The novel infusion system consists of a large volume infusion pump with intuitive infusion delivery designed to inform clinical workflow, enhance the overall patient experience, and improve patient safety. In conjunction with the management system and dashboard, nurses may continually track patients' infusion progress in real-time through their mobile devices. The infusion system also integrates with the

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patient's electronic medical record to further minimize errors and improve provider coordination and care.

iHealthSpace (mghlcs.org/projects/ihealthspace). iHealthSpace is a patient engagement platform designed by a team at Massachusetts General Hospital to create a more personal and collaborative healthcare experience for patients and their care team. iHealthSpace provides a connected customized virtual space that empowers patients to contribute to their healthcare with the support of their family, friends, and care providers, to reduce the fragmentation imposed by organizational boundaries and put the patient front and center. Through understanding health and workflow needs from a patient perspective, iHealthSpace is designed to optimally support patients in tasks to assess their current state of health, manage problems, and prevent medical complications.

Climate Resilient Health Clinics (www.hsph.harvard.edu). The Climate Resilient Health Clinics created by the Harvard T.H. Chan School of Public Health uses an equitable, patient-centered approach to climate action enabling health care to deliver high-quality care for the betterment of all. Partnering with Americares, they are working with frontline health clinics to serve communities where climate change disproportionately impacts their health. By working with providers and staff, the program designs tailored interventions to meet their patients' needs given limited resources and time, to prevent harms before disaster strikes. This project expands across the U.S. to ensure that more clinics providing free or low-cost healthcare are equipped to protect patients from climate risks.

Considerations from the analysis of the Milan and Boston ecosystems

The discourse around patient-centeredness within the Boston and Milan ecosystems showed an interesting division. In the Milan ecosystem, there is a significant focus on user participation, with cases aligning themselves with individual patients' goals and serving people directly. In Boston, co-design with patients was a rarity among things patient-centered mentioned; instead, reliance on gross aggregate data was typically used regarding patient's perspective with a focus more on clinicians and hospitals addressing how they can help them help patients in a top-down manner. These services did aim to address barriers that exist within patient-centered processes, but the barriers that they chose to address and the process for designing solutions do not tend to involve patients' participation within the process. Boston could learn from Milano's approach as to the extent patient data can reflect patients' values without patient engagement; patients will not know how if all their views are being integrated. Likewise, Milano could learn from Boston's focus on clinicians' time and ease of use

of tools as a lack of time with patients, and physician burnout can serve as a significant barrier to empathy and joint decision making.

Both ecosystems are influenced by the larger nature of care within Europe and the United States respectively. Comparing a country with predominantly state-run health care (Italy-Europe) and a country with privatized health care (the United States) is a starting point for understanding the specificities of patient-centered design processes within different geographic contexts and cultures. Europe has had a push from a centralized health care system toward decentralized health care to create more agile systems based on local needs and tied to the local community in which they operate, whereas the US is moving from a highly decentralized system to a more centralized one. As patient-centeredness is implemented in each ecosystem, it should be done with understanding the unique factors that will be needed to garner momentum and the trajectory in which patient-centeredness is heading. In both contexts, the different roles that the service design can play in the innovation of the health system can be further explored about the ability to create solutions, in their material and technological components and in the relational aspects; at a transformative level, therefore on the real ability of service design to modify complex systems in a long-term perspective; not least in terms of policies, to outline where (and if) the change given by patient-centered processes contributes, or could contribute at this level.

Conclusions: limitations and future directions

The collaborative approach presented in this paper aims to contribute to future service design practices in care ecosystems. This paper aims to identify exemplary ways in which healthcare professionals consider patient-centered approaches to expand patient care across boundaries, enabling patients to have greater autonomy in their care and care practices, and rebalancing their agency. A systematic literature review regarding definitions of 'patient-centeredness', combined with the analysis of exemplary cases and projects, helped 1) provide more clarity on its definitions, characteristics, and values, 2) show how collaborative and systematic mapping techniques can lead to a higher-level understanding of ecosystems in different contexts, and 3) raise awareness of what can be done and what values could be added to improve current service design practices for more 'patient-centered' healthcare.

The exemplary cases were analyzed in terms of rhetorical argumentation and presentation of their approach, without yet working on the actual comparison of how the service is executed and delivered. Furthermore, a deeper exploration needs to be conducted to better understand the relationship between services and their materiality or the physical elements that accompany them - i.e., infrastructure and other tangible artifacts - that are fundamental to the holistic experience and interaction with the service through its touchpoints. Finally, our preliminary study can be further improved by working in two directions: exploring the relationship between service design and the ecosystem dimension of contemporary healthcare services and considering an ontological perspective of the holistic approach to service design to improve the evaluation of patient-centered services. To date, research starts from a disciplinary point of view; its evolution will have to address interdisciplinary studies to integrate human-centered and technology-centered approaches further and create collaborations and synergies between service design researchers and practitioners with experts and practitioners in the healthcare sector. Current implementations of service design in healthcare do not realize patients' full potential and still fail to access their deep expertise. The "involvement" of patients in services is overall still rather limited compared to patient innovation cases concerning product solutions. Services still fail to capture and engage the distributed intelligence that can express the relationship between patient, caregiver, and designer, also supported by enabling technologies. We believe that service design can contribute to the initial involvement of patients and their support systems to make them co-creators and co-designers of their care and treatment solutions, expanding the network of experts and stakeholders beyond traditional care structures and infrastructures and strengthening relationships.

Strengthening co-design practices in patient-centeredness would help to rebalance a prevalent production of 'conceptual tools' towards the development of design-experimental processes. In doing so, it is necessary to know the context in which solutions will be developed, to identify barriers (e.g., institutional, organizational, or related to mental models) by adopting an approach to service design that includes a more open approach, multiple and distributed agencies, and a long-term perspective, considering institutional arrangements and interdependencies embedded in multi-actor service systems (Vaajakallio et al., 2013; Vink et al., 2020). Finally, the enhancement of patient-centered practices would improve the care and participation of patients in the co-production of their well-being and expand the impact of the human component within the service system, positively influencing both stakeholder relations and the working conditions of service providers.

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