Healthcare 4.0 and human-centric approach

Sanità 4.0 e l'approccio human-centric

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The hospital is facing even more challenging situations due to new social context and new technologies, the globalization effects, the pandemic and the ageing population. In this work, we introduce the "human-centric" approach in the context of Healthcare 4.0, discussing the innovation that this approach would bring in the way of working and for the patient. Therefore, starting from methodological and philosophical research, we will propose an epistemological and organizational strategy to improve the healthcare service, which focuses on a human-centric approach.

Key words: Human-centric, relational epistemology, people empowerment, methodological innovation, healthcare management

L'ospedale sta affrontando situazioni ancora più impegnative a causa del nuovo contesto sociale e le nuove tecnologie, gli effetti della globalizzazione, la pandemia e l'invecchiamento della popolazione. In questo paper, introduciamo l'approccio "human-centric" nel contesto del settore Salute 4.0, discutendo l'innovazione che questo approccio porterebbe nel modo di lavorare e per il paziente. Partendo dalla ricerca metodologica e filosofica, dunque, proporremo una strategia epistemologica e organizzativa per migliorare il servizio sanitario, che si concentra su un approccio centrato sull'essere umano.

Parole chiave: Human-centric, epistemologia relazionale, empowerment delle persone, innovazione metodologica, management sanitario

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Introduction

The current situation describes an increasingly interconnected world in which every production and welfare sector has to deal with new technologies. Moreover, as also current COVID-19 circumstances show, there is a broader agreement that hierarchical and stratified organizations do not either perform appropriately under pressure and different kinds of emergencies or offer the necessary flexibility and creativity to adapt to new scenarios. At the crossroad of difficulties in managing such issues, there is the speed of production of new technologies and new applications that determines chaos in which one always tries to acquire the latest devices without thinking about the substantial background elements and challenges they have to solve or manage. Healthcare is paradigmatically a central and relevant issue both from a methodological and technological point of view. In particular, as can be seen from both the scientific literature on the subject, the problem of technology transfer must take into account a new understanding of the centrality of the patient who is not only the passive user of a service but a person who must be actively involved in the decision making for the process of therapy. In various documents, this is referred to as 'patient-centric' paradigm.

From a technological perspective, this paper depends on the arguments and position expressed in the paper Hospital 4.0 and its innovation in methodologies and technologies (Afferni et al. 2018). Indeed, the concept of Hospital 4.0 opens the way to a more integrated approach in which the patient is active and involved in the caring process. The benefits of this innovation are:

1. more stakeholder engagement;
2. a growth in awareness of one's health status, healthy life;
3. a competitive advantage of the hospital in the quality of care and costs (Afferni et al., 2018).

This document, however, takes a more general perspective focused on the methodological aspects of healthcare. In particular, the purpose of this document is to analyze, from a theoretical point of view, which organizational methodologies, with specific attention to the person, can be adopted in order to allow a paradigm shift towards a human-centric approach in the health sector.

We believe that real (and urgent) innovation in the healthcare sector today requires a change in the methodological approach primarily. Only in this way will it be possible to exploit all the advantages of technological innovation. We also want to underline the importance of considering the centrality of the person in the health sector not only from the patient's point of view but also from the point of view of the organization itself.

Background

The topic of *human-centric* is going to be a trend in the public and academic domain even if it has not yet been explicitly addressed from a philosophical point of view. Usually, its use is related to procedural, ethical and social aspects. For example, in the European debate on AI, a human-centric approach is proposed, as in the European document *Ethics Guidelines for Trustworthy AI* (Hleg, 2019) drafted by High-Level Expert Group on Artificial Intelligence. That official document aims to give a framework and promotes *Trustworthy* AI which comprehends three main elements: the legal perspective, the ethical issues and the technical and social questions on the robustness of AI systems.

In the introduction, *human-centric* is described as a way of developing AI systems for the "service of humanity and the common good, human welfare and freedom" (Hleg, 2019); it could be interpreted as a particular way to design an AI system for people. This formulation seems to be confused and misleading if we do not analyze the entire document because this paradigm is presented in detail in two sections: the *Ethical principles in the context of AI systems* and the *Fundamental rights as moral and legal entitlements*.

In the section on ethical principles, the *human-centric* design is related to the respect for human autonomy, that means "securing human oversight over work processes in AI systems". We delegate tasks to computers, but the person could monitor and control the processes whenever he wants. In the other section on the fundamental rights, the *human-centric* approach intends to repeat that "human being enjoys a unique and inalienable moral status of primacy in the civil, political, economic and social field" (Hleg, 2019). Thus, a person is a value, on the respect of dignity, to preserve, and all technological development has to be based not only to be under the oversight of human beings but also on the humans' perspective. The definition of *human-centric*, proposed in the glossary of Ethics Guidelines, is "ensure that human values are central to the way in which AI systems are developed, deployed, used and monitored" (Hleg, 2019). Even if this definition is in continuity with the position expressed here, this paper aims to stress more deeply and more comprehensive the centrality of human being and describe it from a relational epistemology.

In the next chapter, we thus first analyze the difference between human- centered and human-centric approach. Secondly, we present the relational perspective that we use to comprehend the complexity and the centrality of the human being.

These aspects constitute the theoretical framework in which innovation is based on the methodological level and, secondary, on the technological implementation.

The human-centric approach in organization

From human-centered to human-centric approach

A considerable literature has recently developed around the theme of *human-centric* approaches. Based on a literary review, this approach comes from the field of design (Bekker and Long, 2000); contrary to user-centered design, which includes the human perspective in all the processes of the ideation and realisation of products, the human-centric involves, in an active and participatory way, the person in the process. Grudin traced the origin of *user-centered* design in the late 1970s when the computer users change from experts, programmers and engineers to less expert users, such as managers and teachers (Grudin, 1990). On the contrary, Participatory Design, which is defined as a *user-centric* approach, "emphasizing active user involvement, throughout the design process, to ensure all prospective users influence both the design process and the product" (Bekker and Long, 2000).

We can say that the *human-centered* approach is based on the users' point of view, while the *human-centric* approach includes the stakeholder as a driving and productive force. Therefore, the challenge is to put the human being as a participatory and proactive player in the productive process. As Maria Sophia Aguire writes, following her studies in the field of macroeconomics, "at the center of these dynamics is the human person, the economic agent, who generates and is served by economic activity" (Aguirre, 2013). An economic transformation that follows these characteristics has, in fact, a significant positive impact on the integral economic development and sustainability. At the intersection of the European documents and these other studies, we can find the question about what dynamics are at stake that asks and relies upon a generative position of the human being in the innovation and transformation processes to make them sustainable. Another challenge is to comprehend how it is possible and relevant to apply this approach to the healthcare sector in which the person is involved directly, as a patient, in the process of caring. The merge between the business and technological perspective developed a new model, called Hospital 4.0 (Afferni et al., 2018), that follows the same dynamics presented in the example of design. It especially stresses a shift from a *patient-centered* approach to a *patient-centric* approach.

In the *patient-centered* approach, the patient is at the center of medical practice and the hospital offers integrated services. The further step makes patients active and involved in a participatory model of personalised medicine. In the *patient-centric* model, the healthcare system establishes a partnership among practitioners, patients, and their families to align decisions with patients' needs and preferences taking into account, therefore, their cultural and social backgrounds too. Moreover, in this paradigm, the patient is a 'smart patient' to the extent that she/he can monitor her/his health with smart devices. In a general sense, this new patient is defined as an engaged, proactive patient who asks questions and seeks out relevant information on her/his health, and is well informed and educated about her/his disease.

At a more macroscopic and general level, we can argue that a human-centric approach would be a suitable and polite framework to develop awareness in an integral perspective in which the core element is the human being considered as a rational and social player.

A relational epistemology for human development

As we have shown in the previous section, the human-centric paradigm can better be understood as a new viewpoint for an approach to economy and technology based on relational anthropology. The centrality of human being, interpreted in an active and participatory way, is the crucial element to analyze deeply the epistemological foundations of a person. Human-centric epistemological foundations, in fact, entail a dynamic and relational under-standing of living systems and social dynamics too.

Thus far, different studies (Bertolaso and Rocchi, 2019; Donati, 2003; Aguirre, 2013) have suggested that understanding human behaviours through a relational epistemology, i.e. a viewpoint on living entities that focus on interactions and inter-level dynamic dependencies, allow to find out variables that capture generative dynamics to solve social and economic challenges and problems of an organization through progressive integration of the different components of the systems. Relying upon studies in life sciences, we also know that, in particular, three dimensions, which are intrinsic and characteristic to any living organisms, play an essential role. We are referring to the genealogical, functional and cultural aspects that shape our personal history, behaviours, lives and values.

The first dimension refers to our genetic and biological setup to our biographical roots. If we were to consider this dimension in a timing metaphor, we could say that it represents the past. Who we are is the result of a complex multitude of factors that have influenced our growth. The genetic heritage is only the first of a long series of influences that have made the persons we are; for example, the family is another fundamental component in our biography. On several levels, biological, personal and general, we can say that the 'past' has formed and shaped the way we are. In the clinical setting, this means that when we become patients, a detailed anamnesis of our disease can have an essential role in the process of diagnoses and therapies. Similarly, the education we received might play a role in the perception or acceptance of clinical measures.

The second dimension represents the present contribution to the development or the actual function of an element in the living system. If we want to maintain the temporal metaphor inaugurated for the first dimension, we can say that this second dimension represents our present. The previous dimension represents who we are, the creative process of the

self; on the contrary, this one focuses on the action in the world. This dimension emphasizes the agency and the role of the person in the present. For a person involved in Healthcare processes, this might help considering that 'the person' could be at the same time a 'friend', a 'son of somebody', an engineer or another doctor him/herself. His/her position in the social and professional world makes a difference in the way he/she will react, on the kind of proactivity he/she might be able to adapt and develop. That is, this dimension addresses the specialized role of the person in a context.

The third dimension refers, instead, and most interestingly, to the dynamic interaction with the context and other elements, for example, in the working environment for the person. It includes topological, semantic, social factors and also values and social virtues, interest and commitments. Wanting to resume the temporal metaphor again, this last dimension does not have an utterly adequate counterpart because rather than being a temporal moment, it represents the dynamics of synchronicity. This third component is, therefore, crucial to stabilize and ensure robustness and adaptability in the healthcare processes as it can -much more rapidly- change the perception of priorities and values in the persons, giving stability or compromising the previous two dimensions or their relevance in the healthcare processes.

This dynamic and relational paradigm, therefore, offers an integrate and integral viewpoint on human beings' integration and behaviors, especially in organization and collective dynamics that is the center of the interest here. At an operational level, it focuses on the transversal features as coordination, cooperation, and collaboration respectively, that are present in our biological balance and the working setting, healthcare compliance and processes.

This dynamic highlights the peculiarity of the terms, coordination, cooperation, and collaboration that, even if commonly are used interchangeably, represent three different ways of working through a network of relationship (in synchronicity). The first one, coordination, refers to the ability to share information and resources so that each party can accomplish their part in the contest of teamwork for the implementation of mutual objectives, where only business as usual activities are required. The second one, cooperation, indicates the exchange of relevant information and resources in order to achieve each other's goal. Sometimes cooperation can be a source of innovation, but always coming from an individual effort and not from a collective effort. The third one, collaboration, is working together to create, from a joint effort, something new in support of a shared vision. This last way of working in a team is currently the most promising for innovation.

Therefore, we think that the consideration of these three dimensions could help in the ideation and designing our society on a human scale. Notably, cooperation and collaboration are going to be very relevant keywords in the following sections.

In order to manage the complexity of the social world, the philosopher of science, Sandra Mitchell, underlines the importance to adopt a model of adaptive management 'in place of "predict-and-act" in order to take into consideration the flexibility for new situations and new knowledge. A deterministic and linear comprehension of economic science is not able to manage the complexity we experience; instead, it is fundamental to recognize the "emergent, historically contingent, self-organizing and self-reflective character" (Mitchell and Streeck, 2009). Because of the ongoing tendency of continuous change, instead of a standard-based paradigm, it is useful to adopt a 'monitoring and adapting regulations'; this shift also implies a modification from a simple model based on linear determinism to a model able to consider the complexity of the person and his relations.

Empowering people

As we can read in other papers (Calvès, 2009; Simon, 1994), the origin of the concept of "empowering" can be traced back to the late 1970s and it was used in various domains, as "feminism, Freudian psychology, theology, the Black Power Movement, and Gandhism". It is connected to the general principle to develop the capability, for individuals and groups, to "act in order to ensure their well-being or their right to participate in decision-making that concerns them" (Calvès, 2009). Despite these historical coordinates of use of the term, there is no universal and shared definition of the meaning of the concept in question. We can argue that it is describable generally as a path of awareness raising in a specific area. Developing awareness means making the man active and personally involved in the processes. The human being is no longer a spectator but becomes the main character in his own existence. One of the most excellent tools we have at our disposal to achieve this goal is the technology that, if used well, supports man in this process of awareness. In today's world, two sectors more than any other have made the term 'empowering' central: the medical field and management. In medicine, we find more and more references on two main trends: Personalized Medicine (PM) and Patient Empowerment (PE). Even if there is no a single and shared definition, we can define Personalized Medicine as a process of care which considers the complexity of each patient taking into account possible comorbidity, historical background and psychological attitudes. While the term 'Patient Empowerment' (PE) refers to the change to involve patients in a participatory and active way in the management of their own health. A PE patient is a person who should be "educated to think critically, make informed decisions and then adjust to prescribed care plans" (Calvillo et al., 2015).

Despite the criticism of these concepts (Morley and Floridi, 2019), from our perspective, the pandemic we are experiencing bears witness to the fact that a more active and

participatory approach is fundamental and necessary in the required field, as healthcare. In this pandemic, people who have contracted the virus and who do not need to be hospitalized must monitor their health condition to report it to the doctor. The individual patient has an important role and responsibility for the common good, and it is clear the importance of personal empowerment in managing his own healthcare to the public national healthcare system and for responsible social behavior, respectful of the health of others. As also Mariachiara Tallachini (Tallacchini, 2020) highlights from the perspective of philosophy of law, citizens' collaboration in combating coronavirus is proving decisive.

In the field of management, the term in question describes a new type of system, whose slogan is "Putting People First". Daniel Newman, the principal analyst of Futurum Research and CEO of Broadsuite Media Group, in the enterprise.nxt newsletter of December 14, 2016, cited the topic of empowerment as the most important lesson for leaders in order to manage the digital transformation. He refers to the necessity to invest in human capital and skills training, as driving forces in the organization. He affirms that "when leaders empower their employees through education, communication, and choice, the hardest part of any transformation strategy – adoption fades away."(Newman, 2016) The consequent benefits of a human-centric strategy in management and company organization lies both in the ability to manage risk and the greater engagement of employees.

In this section, we talked about enabling concepts, such as ensure, participate, and be able to develop an alternative paradigm to the Nordic functional paradigm.

Following the same paradigm, an incredible amount of ongoing research is focused on the role of spiritual, as well as moral, aspect in the workplace. From a literary viewpoint, much current study is focusing on the virtues as fundamental skills to team working. An important suggestion is to understand the virtues as the foundation of the contemporary way of working, based on lateral and conceptual thinking, collaboration, cooperation and project work. This position is based on Aristotle's reflection on cardinal, or 'hinge', virtues, which are necessary and essential for a virtuous relationship. These virtues are moderation, courage, justice and wisdom. Engelland describes those virtues as characteristic traits of business people: the first one, moderation or temperance, "helps business people regain sanity" and take control; courage, or the capacity of master fear or pain, is central to achieving desired goals; justice (or fairness) means the ability of taking up the perspective of others; and wisdom (or prudence) that "gives the business person the grace to appreciate the true, the good and the beautiful in his work. (Engelland 2018).

Methodological contribution to human-centric approach

In the previous sections, we have considered the characteristics and benefits of a human-centric approach, highlighting the links with relational epistemology and people's empowerment. In particular, with reference to the three dimensions of the living being that characterize each person (as seen in section 3.2), the one on which one can act more quickly and more directly is the cultural dimension, which in turn can indirectly change the functional dimension. This section analyzes how some methodologies chosen appropriately can facilitate the paradigm shift towards a human-centric approach, acting on the cultural growth of people and organizations. Methodology innovation could serve to put the value of the human person at the centre of attention in organizations.

Each person with an adequate cultural structure (not theoretical knowledge) through group interaction (cooperation or collaboration) will be able to contribute to the continuous improvement of the organization and of itself.

In an organization structured to welcome and improve people's culture, the need and method for innovation will emerge spontaneously and naturally, indispensable for the long-term survival of the organization and in the interest of its members. In this way, therefore, there will also be a positive return at the level of each individual since in the organization a shared group culture will be born which will offer an inclusive context of mutual enrichment and personal gratification, which in the end, will also allow the realization of the person (human flourishing).

The training and education of people in organizations must be oriented towards interpersonal cooperation and collaboration in order to create real team work rather than simply working groups. Furthermore, the organization should promote the principle of delegation and responsibility towards its collaborators, thus obtaining people's empowerment. In this way, the in- dividual becomes an active protagonist of the corporate organization or in general of any social organization (focused on the person in the corporate or social sphere) and does not remain a passive person.

From a methodological point of view, with respect to the human-centric approach, we can start by considering the contribution of people's culture to activities that require coordination or cooperation. An example of this type of contribution can be found by analyzing the Lean methodology.

The Lean methodology requires education and training to develop personal behavior in view of greater collective effectiveness and efficiency. Adopting this methodology can be a good opportunity to improve sensitivity and personal virtues, not only the four cardinal virtues but also the "fifth" virtue of humanity (for example Truthfulness, Patience, Courtesy, Foresight, Helpfulness, Order, Responsibility, Respect, Tolerance, Trust, etc) (Peterson et al., 2004), promoting attention to detail in the context of one's specific activity,

but always in light of the overall final result from the point of view of the recipient of the service or product to which his personal ac- tivity contributes. In this way, it will be possible to push people towards a proactive approach by abandoning the bureaucratic-reactive approach (silos). The use of Lean methodologies can, therefore, be a valid tool for obtaining that system synergy capable of producing results of greater value than the simple sum of the individual activities, even if performed correctly.

The Lean methodology aims to reduce waste, and this means not only optimizing production but also having a trend towards anticipatory behaviour. Anticipation can be considered as a state of mind, a tendency of the person who can make predictions and imagine alternative scenarios. For example, the philosopher Husserl describes it as the ability to know in advance the goal of an action. Although this is a character that potentially belongs to us, the practice of this habit/attitude requires a substantial methodological chan- ge involving the dualism between proactivity and reactivi- ty. Commonly we experience the reactive way in which the answer to a problem occurs only after it has happened. In case of huge problems, this management system has reper- cussions not only on efficiency, because much time is passed between the insurgence of the problem and the capacity to respond in an adequate way, but also on the efficacy becau- se the quality of the reaction could not consider a sensible number of collateral factors. On the other hand, the pro- active approach significantly reduces the waste of reactive energy through planning, attention to detail, anticipation of problems, simulation of scenarios and actions to modify the factors that influence the risks. From a subjective perspec- tive, this approach implies personal empowerment towards responsible action and awareness of the need for a relational dimension, which can improve the personal project through comparison with other points of view. From an organizatio- nal point of view, this step is necessary to adopt the delega- tion of authority in a fruitful way.

In a more general sense, if we consider the common good both in the company and in society, the ability to guarantee a participatory and proactive approach creates a win-win con- text. Among colleagues, the ability to be proactive and par- ticipatory leads to more efficient and effective work in terms of coordination, and cooperation.

In addition to the Lean methodology, this virtuous circle is also visible in the Open Innovation methodology, mainly for the cooperation aspect. Open innovation is described as "a distributed innovation process based on purposively ma- naged knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough and Bogers, 2014) The current pandemic shows us that this kind of rea- soning and thinking is one of the most useful to achieve a real advantage for companies. In Italy, an example is repre- sented by the call for ideas COVID-19 Challenge, proposed by Campus Bio-Medico University and Marzotto Venture Accelerator. It is aimed at academic research spin-offs, inno- vative startups, SMEs and, in general, anyone - individuals or companies - who has an innovative project or idea to be tran- sformed into an entrepreneurial project, useful to concretely support the Italian system in responding to the current emer- gency. The primary thought is that neither industry nor rese- arch will be able to solve the problem on their own, but that only cooperation and support from a number of players can help stem the pandemic.

Another example of a methodological contribution to the human-centric principle can be found in collaborative innovation. In recent times we have found a growing push towards creative innovation such as Design Thinking where, unlike the traditional approach that delegates the search for innovation to the individual work of specialist designers, we have the search for innovative solutions entrusted to hetero- geneous groups of specialists belonging to different discipli- nes that collaborate with a multidisciplinary approach. In teamwork, based on collaboration, human virtues, sharing, and empathy are more important. Collaborative team mem- bers share a shared vision, value each other's perspective, and contributions unite around a common purpose and values. Managing a collaborative team requires great leadership to create relationships and a culture of sharing. The manager will need to support an open flow of information and the distribution of power and decision making and use diversity as a strategic advantage.

The new vision of human-centric approach in the he- althcare sphere

In this chapter, we analyze how to bring human-centric innovation in healthcare. In the previous sections, we deve- loped the concept of human-centric, how it can be based on people empowerment, and be an occasion of human deve- lopment through a relational epistemology. We also analyzed the importance of virtues in teamwork and more in general while working in organizations to realize a paradigm shift based on mutual cultural enrichment. We have also shown how some methodological innovation about coordination, cooperation, and collaboration in several different modalities of work can offer the context for personal growth toward a more responsible and proactive approach to work. Now we want to analyze the difficulties that can be encountered in introducing a human-centric approach into healthcare orga- nizations and what would be needed to introduce a human- centric approach both from the perspective of healthcare organizations and from the patient's perspective.

For a variety of reasons, healthcare organizations are more resistant to change than other industries. An obvious obstacle to organizational innovation is the central role play- ed by medical professionals in the health system. Deviations

from customary practices can encounter deep skepticism. Furthermore, since health workers are very close to local customs in the department or sector they belong to, they are very attentive to professional colleagues but resistant to the influence of outsiders. Predictably, doctors are in favor of some innovations, such as new drug regimens or medical devices, which have been developed by medical colleagues but do not require significant changes in work routines. Another obstacle is the regulatory environment of the health sector which limits the entry of new actors and limits the possibilities of new models of healthcare. In addition, incumbents often use regulatory debates to create barriers around current healthcare models in the name of quality or safety.

The challenge of innovation in the healthcare sector is wider than a reengineering of processes within the hospital or the introduction of a new technology and should be discussed in the context of improvement in methodologies and culture more generally (Afferni et al., 2018). Furthermore, technology changes like digital transformation should be considered as one of the enabling factors for cultural change and not only as a new business opportunity. The true challenge of the digital transformation is not the "digital", but the "transformation". Organizational transformation in healthcare toward a human-centric approach requires a different mindset and process able to engage everyone, the patient and the caregivers, in a widespread process of change, in a collaborative way. It is needed for value creation, to turn this wealth of technologies and information into real value for the patient. A cultural shift towards a human-centric vision is needed to take advantage of digital technology in order to empower people. A digital transformation without a human-centric vision can only lead to overwhelming technology.

As an example of an analysis of a misinterpreted transformation, we cite the position and recommendations of the Christie Commission in Scotland (2011) (Christie et al., 2011) on the future of public sector services in the UK. We can apply the same considerations to the health sector because today it is one of the most important public services offered to people. One of the criticisms recently raised about applying methodologies focused on internal improvements in the UK public sector is whether customer service is considered part of the redesign of processes and/or services (Radnor and Johnston, 2013). It has been suggested that focusing on one without the other is not only questionable from an organizational perspective, but also contrary to the strategic direction in the UK public sector (Rodgers, Antony and Marshall, 2019). In Scotland, the Commission on the Future Delivery of Public Services found that there was a need for reform and that public sector services were still based on a principle of providing service to people rather than with or for them. The Christie Commission also stated that there was a need to work more closely with individuals and communities to understand their circumstances, needs and aspirations (Christie et al., 2011). Even more recently, the
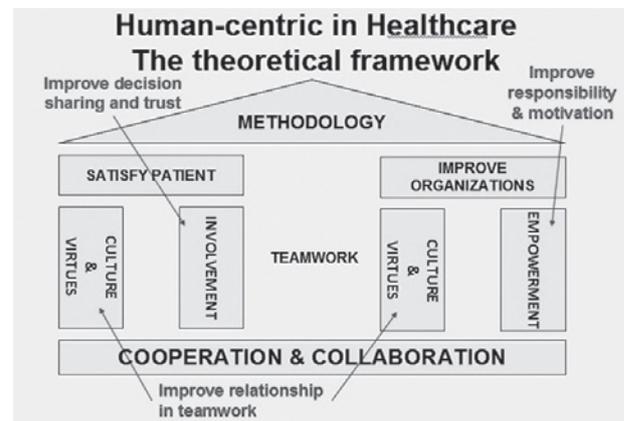

Figure 1. *Patient-centric in healthcare.*

Scottish government has issued the Community Empowerment (Scotland) Act, 2015 (Parliament, 2015), which reinforces the recommendations of the Christie Commission by providing a legal right for community bodies to participate in the planning and development of local activities. (Rodgers et al., 2019).

Methodology innovation should serve to reinforce the importance of the "Voice of the Customer" as a way to put the value of the human person at the centre of social life. Collecting the voice of the customer has a whole chapter dedicated to it in The Lean Six Sigma Pocket Toolbook (George et al., 2004) with the purposes of gathering the voice of the customer including "to set priorities and goals consistent with customer needs" (p. 55) very much in line with the key point made by Radnor and Johnston (Radnor and Johnston, 2013). The challenge in gathering the voice of the customer is of course recognised as it is not always easy to identify who the customers are (Alford, 2002) and the views of the citizens who pay for and have expectations from the service may well be different from the clients who actually directly use the services, and this brings us back to the need to consider perceptions of the service as well as actual customer satisfaction.

In order to answer the question of how to bring innovation based on the human-centric approach in healthcare, overcoming the obstacles and facing the challenges we have mentioned above, we must refer to the principles set out in Chapter 3, as summarized in the Figure 1, which constitute our theoretical framework. Starting from this theoretical framework, we will analyze, in the following two parts, respectively what to do in healthcare organizations and how to transform the patient model.

*Human-centric from the healthcare organizations point of view*

The human-centric vision in healthcare organizations call for a methodological innovation that we can articulate in three levels of deployment:

a) strategic level: responding to the new challenges that arise, always keeping the vision and objectives of the mission alive, requires the will and ability to renew the institution as a whole and the individual people who make it up by adopting effective measures. Through the transformation of the behavioural values of the Medical, Nursing, Technical and Administrative staff to ensure sustainability and continuous improvement. We can summarize the goal of renewal as "More Quality more Person";
b) governance level: as general objectives, PROMOTE the institutional culture and the social role by adhering to the Mission Statement and sharing the contents of the code of ethics. STRENGTHEN a culture that rewards merit, measured by the benefits brought to the common good. SLIMMING the authorization procedures and promoting/increasing the delegation and responsibility (people empowerment). DEVELOP Culture, virtues and values of human resources;
c) Operational level: Simplify the processes. Optimize the organizational structure. Make staff more involved in the tasks of government functions and bodies. Improve communication between government bodies. Obtain a unified, clear and streamlined Organization.

Promoting the continuous improvement in the healthcare organization is not just about listening to the patient's voice, but also about developing a culture of quality in staff. In this way, each operator will be responsible for the quality of his work and will enhance the human factor in relations with other people, colleagues and patients. This will also make it easier to achieve patient satisfaction.

Human-centric from the patient point of view

From general to particular, the human-centric approach becomes patient-centric when collaboration and cooperation from the work team (healthcare team) are extended to include also the patient (Fig. 2). Culture and social behavior strongly influence the way people deal with risk factors and the threat of disease. Promoting a culture of health in so-
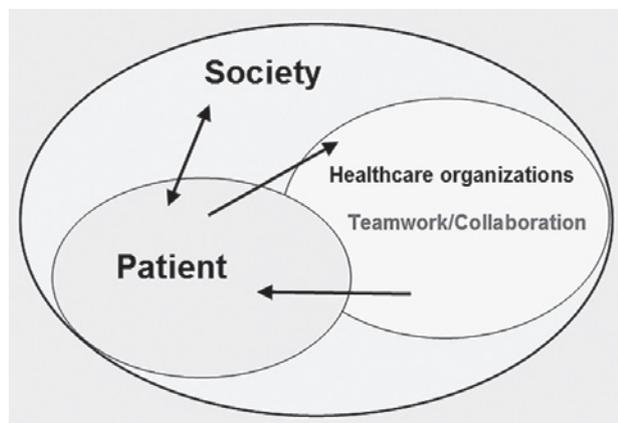
Figure 2. *Patient-healthcare interaction.*

ciety will improve disease prevention through the growth of individual responsibility. Without attention to personal singularity, there can be no real medicine. As the patient's expectations and needs become more aware and complex, it is natural that isolated, uncoordinated and occasional interventions focused on the patient's pathology move towards an inevitable obsolescence. What was once an option is now an imperative.

Patient-centric healthcare requires personalized medicine. Personalizing means recognizing the patient's well-being needs, responding adequately through the care and techniques available and respectful of his humanity. Digital tools can facilitate patient profiling, providing a more complete picture of the characteristics and habits that characterize it, going beyond the traditional practice of anamnesis. Furthermore, the healthcare team should be opened to the whole civil society with its several different organizations. In this way, health becomes a common good to be preserved with the contribution of all.

Conclusions

We are increasingly experiencing a paradigm shift from human-centered to human-centric approach; this paradigm shift is connected with a new vision of the person, technology, innovation and their interconnections. Our paper started from the concept of Hospital 4.0, as a technological realization of a new pathway, in order to analyze the new paradigm more deeply. Mere technology does not solve the problems if it lacks the ability to insert this technology in a methodological/paradigmatic management and organizational framework. In turn, this requires a change in the conception of the epistemology of the person based on three dimensions: the biographical root, the present function and the importance of a dynamical relation. This new vision of person highlights a new framework that we have identified, in the human-centric approach in which the three dimensions are lived in continuity in a relational, not functional, perspective. From a methodological point of view, this centrality of the person and the epistemological foundation implies a new model of awareness and management in organizations, based on coordination, cooperation, and collaboration. This paper has shown three possible examples of methodological approaches based on these principles, Lean Methodology, Open Innovation and Collaborative Innovation. Due to the peculiar situation we are living, we think that this transformation will be evident particularly in the healthcare sector in which the challenge of an organizational transformation towards a human-centric is twofold: from the organizations' point of view, a human-centric approach helps in the strategic, governance and operational levels fostering the peculiarity and importance of the person in the organization; while, from the patient point of view, a human-centric approach means that

the patient is involved actively in a cooperative and collaborative work team.

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