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Digital business models and ridesharing for value co-creation in healthcare: A multi-stakeholder ecosystem analysis

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ABSTRACT

The current advancements in digital technologies offer new opportunities for designing and modelling digital business models. In many industries, particularly in healthcare, coordinating and managing relationships with different stakeholders are well-known problems that organizations regularly face. Despite the increasing theoretical and practical relevance of digital business models in healthcare, to date, there is a lack of specific research focused adequately on how value is created, delivered and captured for the various stakeholders in centrally mediated platforms within the healthcare ecosystem. By conducting an exploratory qualitative analysis, this study explores the case of Saluber, an Italian digital start-up offering ridesharing services for non-emergency medical transportation.

The results show a series of various service value drivers, single-level benefits and community-level outcomes by which the central mediator of this sharing economy platform creates, delivers and captures value for its various types of stakeholders. These aspects are made available by the integration of digital business models. A multilevel framework of healthcare ecosystem rearranging was developed, which expands the value co-creation process beyond collaboration among various types of stakeholders and emphasizes the outcome of the digitalized network. Implications for scholars and managers are offered.

1. Introduction

The sharing economy (SE) has emerged in recent years as a disruptive approach in many industries (e.g., transportation, tourism, restaurants) for creating and delivering value, organizing, managing, marketing and delivering traditional services in novel platform-based ways (Munoz and Cohen, 2017; Yaraghi and Ravi, 2017). SE is a complex phenomenon enabled by digital technology, which refers to “a socioeconomic system enabling an intermediated set of exchanges of goods and services between individuals and organizations which aim to increase efficiency and optimization of under-utilized resources in society” (Munoz and Cohen, 2017). The SE system directly impacts how organizations frame their business model, which is “a design or

architecture of the value creation, delivery and capture mechanism” (Teece, 2010). Within the last 15 years, some of the most innovative and successful companies worldwide, such as Uber, Airbnb, and Blablacar, applied the SE principles in order to design their successful digital business model (DBM) and implement their technological platforms. In doing so, such companies act as central mediators (meta-organizers) of complex ecosystems, often made out of a heterogeneous set of stakeholders (Breidbach and Brodie, 2017; Sutherland and Jarrahi, 2018).

The mechanisms by which these mediators create, deliver and capture value via their DBM and SE platforms have been widely analysed in the literature (e.g., Richter et al., 2017; Munoz and Cohen, 2017; Apte and Davis, 2019). These value-focused mechanisms turn around the sharing of digital content, physical goods and social benefits (Richter

Abbreviations: SE, Sharing Economy; HO, Healthcare Organization; DB, MDigital Business Model; NEMT, Nonemergency medical transportation.

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et al., 2017). Munoz and Cohen (2017) outline 7 key underlying components of DBMs within this domain: platforms for collaboration, under-utilized resources, peer-to-peer interactions, collaborative governance, mission driven, alternative funding, and technology reliance. Companies offering SE services can exploit some of these elements to design their DBM and the value propositions for their customers, suppliers and other partners (Apte and Davis, 2019). This evidence suggests that the mechanisms of value creation, delivery, and capture (in order words, the DBM) designed by central mediators within such domains should be specific and heterogeneous for each different type of corporate stakeholder.

However, prior research did not focus adequately on how the central mediators of SE platforms should design their DBM for very complex, large and heterogeneous multi-stakeholder ecosystems (e.g., Breidbach and Brodie, 2017). Coordinating and managing relationships with a large variety of stakeholders are well-known problems that healthcare organizations (HO) regularly face (Frow et al., 2016). In this industry, DBMs rapidly become crucial to both link together heterogeneous groups of healthcare stakeholders (hospitals, national agencies, manufacturers of drugs and medical equipment, patients and caregivers) and create, deliver and capture value for HO via the marketing of better and more personalized solutions (Hwang and Christensen, 2008; Elton and O'Riordan, 2016; Wang et al., 2018). Despite such increasing theoretical and practical relevance, there is no trace in accounting and management literature about how the central mediators of SE platforms offering health services should develop specific value propositions and mechanisms for value creation, delivery and capture for their wide set of business stakeholders.

The present article contributes to both the emerging stream of literature about DBM for SE platforms (Munoz and Cohen, 2017; Apte and Davis, 2019; Ritter and Schanz, 2019) and the stream of research about DBMs in healthcare (e.g., Hwang and Christensen, 2008) by providing an extended, detailed and stakeholder-focused view of the mechanisms of value creation, delivery, and capture within such a complex business ecosystem. Thus, the research question of the article is how value is created, delivered and captured for the various stakeholders in centrally mediated SE platforms. To answer this question, we used the qualitative research method of a case study (Yin, 2017) to explore the case of Saluber, an Italian digital start-up offering ride-sharing services for non-emergency medical transportation (NMET). We collected and analysed both primary and secondary data via more online documentation, archival documents, in-depth interviews, and sessions of focus group with the company management and stakeholders. A qualitative data analysis was conducted following Gioia et al.'s (2013) method to search for rigor in our case study approach.

A "multi-stakeholder ecosystems" approach, a rising perspective in the strategy and innovation literature (Pera et al., 2016; Ciasullo et al., 2020; Velter et al., 2020), is used to interpret the results of the study and develop our inductive theoretical model. Our findings consist of a series of various service value drivers, single-level benefits and community-level outcomes by which the central mediator of this SE platform creates, delivers and captures value for its various types of stakeholders. Various implications for the theory and practice of DBM are offered. The remainder of the article is organized as follows: after the present introduction, the main literature about DBM and SE is reviewed. Section 3 illustrates the employed research method. Section 4 reports the findings emerging from the explored case. Section 5 discusses these results, offers various implications for scholars and managers and reports some limitations. The last section concludes the study.

2. Literature review

2.1. Digital business models in sharing economy

Digital transformation is the greatest challenge for business today. The relevance of this emerging topic is highlighted by the exponential

increase in the number of publications over the last 3 years (Kraus et al., 2019).

Digital transformation promotes a business logic based on digital technologies, which enables the experimentation and implementation of novel models of business, labelled digital business models, for creating and capturing value (Teece, 2010; Berman, 2012; Verhoef and Bijmolt, 2019; Mancini, 2019). A business model, thus, can be categorized as digital if digital technologies trigger fundamental changes in these value dimensions (Veit et al., 2014). Prior research extensively analysed DBMs and provided various specific frameworks of this concept (El Sawy and Pereira, 2013; Bock and Wiener, 2017). Value creation is, obviously, the most important process that any DBM should enable. In the first instance, value creation results from the so-called "utilitarian value" through price, cost, or efficiency advantages (Täuscher and Laudien, 2018). A DBM can improve transaction efficiency and enhance cost advantages. Therefore, the greater the transaction efficiency gains that are enabled by a particular technology, the lower the costs and hence the more valuable it will be (Amit and Zott 2001; Täuscher and Laudien, 2018). By reducing the distribution, transaction, and search costs of products and services, companies can achieve an advantage in revenues (Pagani, 2013). A DBM also improves the quality and range of content and services provided by a company. Digital products and services can be reproduced at zero marginal cost, and they can create exponentially, via network externalities, more value when more users join, so the value is determined in use (Remane et al., 2017). Furthermore, value creation is determined by emotional value through superior user experience and by social value through the interaction with other stakeholders, becoming part of a community (Täuscher and Laudien, 2018).

DBMs are essential for the success of organizations managing and orchestrating SE platforms.

SE refers to economic and social activity that involves online transactions related to sharing and reusing resources. It is a technological phenomenon that relates to online collaboration, social commerce, and online sharing (Hamari et al., 2016).

SE companies are based on platforms providing a matchmaking service where individual customers or businesses can take part on either or both sides of a service transaction (Apte and Davis, 2019). SE companies have hence innovated traditional BMs by creating digital platforms and two-sided (or N-sided) markets connecting different customer groups, creating value for customers through the interaction between upstream and downstream stakeholders, as they trigger network effects between the demand and supply side (Sanasi et al., 2020).

Many recent studies in the literature (e.g., Apte and Davis, 2019; Kathan et al., 2016; Sutherland and Jarrahi, 2018; Munoz and Cohen, 2018) have highlighted the characteristics common to SE companies. Specifically, these companies are considered intermediaries that connect customers looking for a service with the suppliers of that service. Through their digital platforms, they provide ease of access to the information and reduce steps and times in the service delivery process, thus lowering transaction costs. Therefore, the digital platform plays a central role, encouraging the use of new technologies as an access channel to new relationships between companies and users to allow new forms of value creation and capture. Furthermore, the ubiquity of the internet and of information and communication technologies makes sharing easy and possible on a scale.

SE companies facilitate the sharing of underutilized assets, thus recovering the marginal cost of using them. They are characterized by non-ownership of resources, which gives these companies high flexibility.

Digital technologies enable new resource configurations by positioning SE companies as mediators balancing both the consumption and contribution from the platform participants (Sutherland and Jarrahi, 2018). Mediators provide structural support for the exchange and integration of resources, thereby co-creating value between the actors of the ecosystem and facilitating interaction and service exchanges (Breidbach and Brodie, 2017). Sutherland and Jarrahi (2018) present an organizing

model for categorizing SE mediators: a model of centralized, streamlined intervention and a more decentralized, emergent set of interactions (Fig. 1). The centralized mediator has a strong presence in the exchanges between participants; in contrast, decentralized mediator exercises little control beyond matchmaking but instead leverages the resources and innovation of its population of users. Centralized mediators facilitate trust and logistics components that need to be supplied into any peer-to-peer activity (Kane, 2016).

The spread of platforms represents the enabling technological element, which has allowed the development of new business models in practice.

Various configurations of DBMs for the sharing economy have been proposed and studied in the literature.

Referring to the specific BMs for SE, they can be designed to offer peer-to-peer (P2P), business-to-consumer (B2B), and business-to-business (B2B) services (Apte and Davis, 2019). DBMs for SE are diverse and can emerge under different conditions. Kempf (2013) recognizes three different dimensions of the sharing economy: the sharing of digital content, the sharing of physical goods and crowdfunding. Richter and co-workers (2017) modify and extend the work of Kempf (2013) by establishing a framework consisting of basic requirements, drivers, fields of application, and the key goals of SE: added value and win-win situations. Acquier et al. (2017) position the sharing economy on resting on access, platform and community-based economies. Munoz and Cohen (2017) propose five different configurations of DBMs for SE central mediators: Crowd-based tech, Collaborative consumption, Business to crowd, Spaced-based & low-tech sharing, and the Utopian sharing outlier.

Despite the proliferation of various frameworks, there is no consensus among scholars about how a DBM for SE platforms should be structured. Researchers call for deeper investigations regarding business

models underlying the sharing economy. Conversely, theory proposes several configurations of value capture, value delivery, and value creation mechanisms for this industrial setting.

2.2. A multi-stakeholder ecosystem perspective about value delivery in se platforms for the healthcare industry: some speculations

An emerging approach adopted by scholars of strategy, marketing and innovation management for their empirical research is the notion of a multi-stakeholder ecosystem, which “encapsulates both the network nature of these relationships [between stakeholders] and the complex set of subcultures that make up this ecosystem. Ecosystems are normally used to refer to systemic interactions within biological environments consisting of both physical and biological components” (Gyrd-Jones and Kornum, 2013). Firms engaged within these contexts have to take into account the impact of such relationships and, overall, the network interdependencies between the various groups of stakeholders (Pera et al., 2016; Reypens et al., 2016). In these inter-organizational configurations, value is co-created via the interaction of multiple stakeholders and is extracted by a party (the central actor of the ecosystem) that orchestrates the delivery of service (Berman and Marshall, 2014; Pera et al., 2016). As many actors are involved in these ecosystems, various patterns of resource integration emerge, which can transform the extant resource configurations and dynamics of value creation for each actor (Breibach and Brodie, 2017).

The notion of a multi-stakeholder ecosystem properly describes the complexity and heterogeneity of the relationships between various types of actors in the healthcare context.

Coordinating and managing these relationships represent major challenges that the healthcare industry must face (Frow et al., 2016).

The primary function of any organization is value creation,

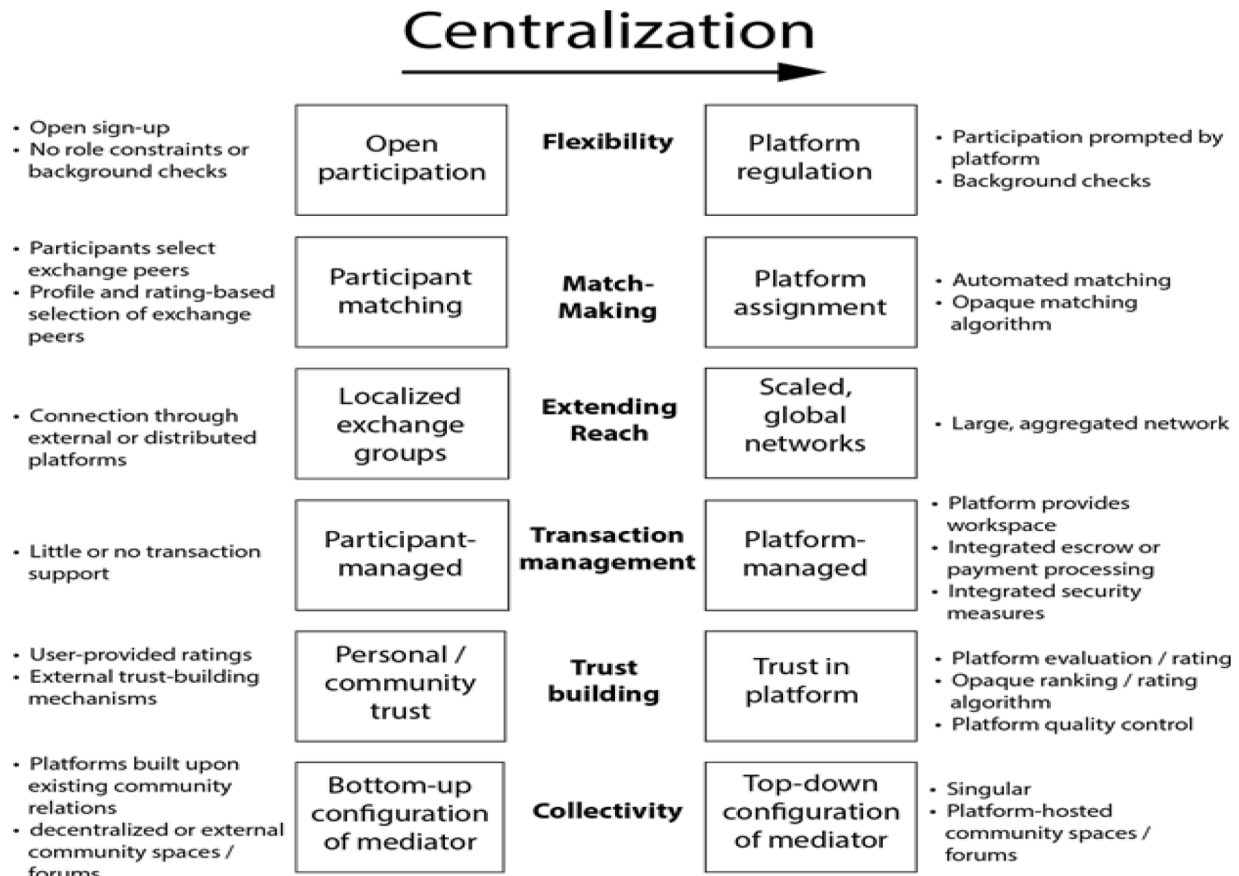


Fig. 1. Organizing models of the sharing economy. Source: Sutherland and Jarrahi (2018).

especially in transformative industries such as healthcare (Lee, 2019). This industry is an important and suitable setting in which to investigate how value is created via the interactions of many different types of stakeholders. Following this view, Frow et al. (2016) articulate the healthcare ecosystem at four different levels and identify many examples of actors involved in practices of value creation (and co-creation) at every level of the ecosystem. At the mega level, there are government agencies and regulatory and health funding bodies who collaborate to determine aspects of health policy. State health authorities who determine funding allocation, professional associations of doctors and nurses, and health insurers are located at the macro level. The meso level includes hospitals, clinics and local health support agencies. Finally, at the micro level, clinicians and patients working together with nurses and health professionals are involved to design the treatments.

Drawing on these assumptions, some theoretical speculations can be developed about how value is created, delivered and captured for the various stakeholders in centrally mediated SE platforms of the healthcare ecosystem.

SE platforms enhance stakeholders to perform a range of activities, shaping ecosystems for value creation, delivery and capture (Kenney and Zysman, 2015).

Considering the healthcare ecosystem as composed of four levels (Frow et al., 2016), it is possible to highlight the mechanisms of value creation, delivery and capture provided by the SE platform.

At the micro level, the SE platform improves health care accessibility and patients' experience by enhancing patient satisfaction and safety. Furthermore, it improves clinical outcomes from clinicians and health professionals by enabling better resource integration across the healthcare ecosystem and by improving the accuracy of resource allocation. At a meso level, the SE platform enhances HO operational effectiveness, as it improves the efficiency of internal operations, productivity, clinical effectiveness and profitability through a better quality of healthcare services and cost containment and maximizes resource allocations. At the mega and macro levels, the SE platform enhances transparency, which is associated with a reduction in fraud and corruption in healthcare financing, reduces risks and improves community safety.

Overall, looking at the whole ecosystem, SE platforms enhance the accessibility to healthcare information among stakeholders positioning at different levels of the ecosystem. Moreover, the use of digital technology automates a wide range of health service processes, making health service delivery fast and simple. SE platforms create trust among the participants of the ecosystem that enhances customer loyalty and satisfaction and indirectly increases revenues.

Prior research stresses that network size is a crucial determinant for the success of digital platforms selling SE services (Teece, 2018). Nevertheless, the need to deliver as much as possible good quality services to end-users is also a crucial requirement for platform mediators to obtain customer satisfaction and loyalty over time, especially in a demanding market such as healthcare. The satisfaction of these two potentially contrasting needs (quality and quantity of SE operations) is likely to be a key element for the success and value creation of every SE platform. The accomplishment of both needs obliges the platform mediator to implement a DBM whose primary goals are the creation and coordination of a surrounding business ecosystem that is both a) potentially large and scalable and b) just made out of experienced actors that can interact properly with each other.

Prior research about SE shows such digital platforms very often, especially when they connect together two or more markets, creating a multi-stakeholder ecosystem (Breidbach and Brodie, 2017). In healthcare, more generally, the creation of wide and diversified ecosystems is also an outcome of digitalisation, by which new technologies allow gathering in real-time big data analytics for health and disease management via ubiquitous devices, sensors and apps (Steinberg et al., 2015; Wang et al., 2018). However, these digital multi-stakeholder ecosystems operate and provide SE health services within a multi-layered industry, already greatly affected and regulated by many, existing, and

heterogeneous offline ecosystems (Frow et al., 2016; Schiavone and Simoni, 2019). These two types of ecosystems (online and offline) are unlikely to match and correspond completely (for instance, health regulators might not belong to the platform, but they will somehow affect its operations). Thus, platform mediators have to craft the building blocks of their DBM (e.g., pricing policies, security standards) in ways that facilitate the overlapping and integration between the digital multi-stakeholder ecosystem and the industry offline multi-stakeholder ecosystem.

2.3. Ridesharing in healthcare

Prior research largely stresses that digital technologies create new opportunities for value creation for HO and change the way in which these actors usually interact and exchange resources (Elton and O'Riordan, 2016; Wang et al., 2018). Indeed, if properly implemented, digital technologies can improve patient empowerment and quality of life, enable communication among healthcare professionals and patients, and reduce both errors and length of hospitalization (European Commission, 2018). A number of recent research articles and reports stressed the great potential of SE for the achievement of such goals by HO (Miller et al., 2016; Powers et al., 2016; Chaiyachati et al., 2018; Rochlin et al., 2019). Many digital platforms offering non-emergency and low-end healthcare services emerged (Yaraghi and Ravi, 2017). Health services now can be delivered and sold, via these digital platforms, in geographical areas formerly unserved by HOs (Miller et al., 2016).

Mobility is one of the most important business segments in which SE has been applied to date. The core business of many first SE companies, such as Uber and Blablacar, is ridesharing. This is "a mode of transportation in which individual travellers share a vehicle for a trip and split travel costs such as gas, toll, and parking fees with others that have similar itineraries and time schedules" (Furuhata et al., 2013). The first form of ridesharing (carpooling) appeared in the early 1940s. After the advent of smartphone applications and social networks, the dominant business model in this domain became P2P ridesharing (Cohen and Kietzmann, 2014). Network size is a crucial condition for ridesharing platforms to succeed, as shown by the stories of growth of Uber and its rival Lyft in large metropolitan cities (Teece, 2018).

With specific reference to ridesharing, recent literature shows that this approach can lead to very positive results for both HO and end users. They are provided by non-medically skilled personnel and can include various options, such as wheelchair vans and car services (Powers et al., 2016). The results of a pilot program conducted by Lyft in 2016 approximately 479 ridesharing services offered for non-emergency medical transportation (NEMT) in the USA show average wait times decreased by 30.0% and average per-ride costs were reduced by 32.4%. Customer satisfaction was higher than 80% (Powers et al., 2016). Rideshare-based transportation service, thanks to its lower costs and higher efficiency, increases show rates to primary care for Medicaid patients (Miller et al., 2016).

Detsky and Garber (2016) suggest that the "Uber message" is a great stimulus to innovation for the entire sector and can fix the weaknesses and failures of several health services. This evidence is very important in terms of public health since the efficiency and quality of NEMT services can greatly contribute to the improvement of access to care (Wallace et al., 2005). Over the last few years, the leading tech companies of the SE, such as Uber and Lyft, entered the healthcare sector by launching ridesharing digital platforms for the transportation of patients and/or medical equipment (Powers et al., 2016; Rochlin et al., 2019; Davis Pluess et al., 2016).

However, prior research did not focus adequately on how the central mediators of SE platforms should design their DBM for very complex, large and heterogeneous multi-stakeholder ecosystems (e.g., Breidbach and Brodie, 2017) such as ridesharing in the healthcare industry.

3. Research method

We conducted a qualitative case study. This method is useful when the shape of the research question is "How?" (Yin, 2017). The present exploratory study analysed a relatively new approach, such as SE, in healthcare by focusing on the DBM arranged for the commercialization of ridesharing services for NEMT. For the singularity of the case and the lack of a pre-existing theoretical framework, an exploratory case-based study structure was implemented (Meredith, 1998; Yin, 2013). Exploratory case studies can be structured when researchers do not generate preventive propositions and hypotheses (Mills et al., 2010). We selected an extreme case of a digital platform offering ridesharing services (Seawright and Gerring, 2008) within a specific geographical area. The digital start-up Saluber (<https://www.saluber.me/en/home>) developed the first European digital application for the management of health logistics and in 2018 won the SMAU innovation award. This digital company operates in the Campania region (Southern Italy), the third most populated Italian region with a population of nearly 6 million inhabitants. Saluber is implemented by the new-co Bourelly 4.0 SRL, whose core business is the development of international high-tech projects, and the Italian HO Bourelly Health Services (the first partner of Saluber) experienced organization with an in-depth knowledge of the national and regional health system. We had formal permission to display the name and information related to the company and that interviewees gave informed consent.

Currently, the Italian healthcare logistics market is very fragmented, not completely aware of digital technologies and mainly managed by small local firms (Lega et al., 2013; Parente et al., 2018). Such conditions decrease the market access for users and, over time, push many firms to try to exploit new technologies for improving their business and ameliorating the coordination among all the industry stakeholders. As described on the official website of this digital platform (<https://www.saluber.me/en/home>), the Saluber mission is improving the patient journey by providing convenient, cost-efficient and reliable rides. It also provides reliable rides to travellers with disabilities and improves their travel experiences. Referring to the approach to sharing business modeling (Munoz and Cohen, 2017), Saluber seeks to comprehend the diversity of the stakeholders involved in their healthcare network. The need for mobility services not only concerns elderly or sick people or those with physical disabilities in the area but also tourists needing clinical or social assistance.

3.1. Research design and data analysis

We collected and analysed both primary data and secondary data for investigating the DBM arranged for the ridesharing of NEMT. Specifically, we tried to understand how such DBM was designed to coordinate the value created, delivered and captured to the large and heterogeneous network of stakeholders to be involved in offering ridesharing services in healthcare. To reach the triangulation of data (Yin, 2017), we used more sources of evidence: 1) online documentation; 2) archival documents; 3) in-depth interviews; and 4) focus group. The overall data collection took place in May 2019.

The analysis was organized in four phases. First, we analysed the Italian health system to understand the range of services offered by HOs that work on mobility and nonemergency medical transportation.

We noted that stakeholders with different decision-making powers took over from those specific actions of the doctors or firms. It is no longer just the health system to decree the market access of a medical device or to manage policies of specific health services (es. health mobility services). Currently, there are regional bodies or decision makers and health departments involved in decision making. This new multi-stakeholder ecosystem has therefore changed the complexity from the point of view of the actors involved. Achieving competitive advantage means choosing at the regional and local level how the new subjects act and how to cooperate with these different stakeholders.

This phase also included a screening of the main trade press articles and official reports about telehealth platforms for ridesharing services. After that, we collected official archival documentation (e.g., websites, official social magazines, and digital platform data) about the Saluber app tested by Bourelly Health Services in 2018. In the third phase, we implemented various in-depth interviews. This source of information is the most appropriate when little is known about the phenomenon under investigation or when detailed insights are required from individual participants (Gill et al., 2008). We interviewed every member of the top management of Saluber, including the CEO and its immediate subordinates: Marketing Manager, Project Manager, Administrative Services Manager and Sales Manager.

We conducted semi-structured interviews. As the general aim of our study is to understand how DBM by centralized mediators in the sharing economy creates value, we designed the interview structure by considering the framework Business Model Canvas (Osterwalder and Pigneur, 2010). The interviews included open-ended questions to gather opinions about the use and benefits of Saluber in NEMT. We also used some questions about the conditions and consequences of the adoption of this platform in other healthcare mobility services. Each interview typically took 90 min. We followed the "24-hour rule" (Eisenhardt, 1989) for the transcription of the interviews into written form and matched the results with our field notes to fill in possible gaps.

Finally, we used focus group interviews to explore the value creation achieved with the company DBM. Although individual interviews and focus groups are independent data collection methods, their combination can be advantageous to researchers as complementary views of the phenomenon may be generated. Individual interviews and focus groups may also be combined for the purposes of data completeness and/or confirmation (Lambert and Loiseau, 2008).

As this work is exploratory in nature, focus groups were appropriate for exploring the complex and poorly understood issue of value creation in the complex ecosystem arranged for ridesharing services because they encourage questions and discussion, probe for depth, reflection on others' opinions and reconsideration of personal views (Kitzinger, 1995). From this source of data, we obtained a comprehensive view of the users' perceived benefits from their use of ridesharing services. Because how HOs collaborate to create value from these digital networks of ridesharing has been scantily examined, focus group interviews can help discover some concepts or mechanisms not addressed in previous research. Saluber networks include carriers (e.g., companies with vehicle fleets such as ambulance, shuttle bus for the disabled), intermediary centres (diagnostic centres, pharmacies, clinics), public utility companies and healthcare professionals (e.g., doctors, nurses, physiotherapists and health workers). The next section provides details for each actor.

We conducted four focus groups. The participants were the main actors of the Saluber network. The first focus group included carriers ($n = 6$), the second group included intermediary centres ($n = 4$), the third group included healthcare professionals ($n = 4$) and the last group included public utility companies ($n = 3$). Each participant was selected and recruited with the support of the platform Marketing Manager. Each focus group was held at Parthenope University of Naples, Italy. The discussions were facilitated by our experience with taking notes and noted non-verbal aspects of the group participants. Each discussion lasted approximately one hour and a half. The participants had no previous relationship with the researchers.

After the kick-off presentations, welcome round and the participants' introduction, the facilitator asked to discuss the features of ridesharing services for NEMT, based on the evidence from the literature and their own experiences, and how these services impacted HOs. The groups were moderated using the same topic guide, with four groups of questions (Appendix), regarding the benefits derived from the use of Saluber. All discussions were audio-recorded, transcribed verbatim and anonymised (Powell and Single, 1996).

A qualitative data analysis was conducted following an iterative

process articulated in several steps (Mayan, 2009; Gioia et al., 2013; Merriam and Tisdell, 2015). Basically, the main goal of data analysis is to find answers to the research question through categories or themes intended as findings of the analysis (Merriam and Tisdell, 2015). For these reasons, we followed Gioia et al.'s (2013) method to have rigor in qualitative data analysis; indeed, we connected the first-order descriptive terms (es. quotations) and the second-order themes (es. main topics emerged) to the identified aggregate dimensions: (1) A central mediator as enabler of business relationships in the healthcare ecosystem; (2) Digital business model and ridesharing services in healthcare; and 3) Value co-creation in the multi-stakeholder ecosystem.

The data were analysed by coding, which divided the relevant content of transcripts into categories of different themes (Krippendorff, 2004). To confirm and triangulate the data and information gathered from the in-depth interviews and focus groups, some extra sources were explored as secondary data from the official company website, specialized trade press and other official reports. In analysing and interpreting data, we used an inductive approach through thematic analysis (Braun and Clarke, 2006) by implementing the Nvivo software to determine the codes manually extracted from our data collection. The overall process begins by identifying any units of data that might be relevant to our study and assigning codes to them. Then, we tried to group together the codes that presented analogies and affinity of meaning within the same category. Finally, the categories were in turn grouped within broader themes and then end up within the identified aggregate dimensions (Gioia et al., 2013), which were also confirmed and validated from the point of view of the key respondents. To ensure the validity and reliability of our study, two co-authors coded and analysed the same qualitative data independently and compared their findings (Patton, 2014). A decisive agreement coefficient should measure agreements among the multiple descriptions of each unit of analysis and indicate the likelihood that conclusions drawn from imperfect data are valid beyond chance (Krippendorff, 2004). In addition, the use of multiple methods of collecting data further strengthened the reliability and validity of our study.

4. Results

The aim of this paper is to understand how value is created, delivered and captured for the various stakeholders in a centrally mediated SE platform within the healthcare ecosystem. The case of Saluber analyses the adoption by the HOs of a digital platform that leads to co-create value among different stakeholders involved in such an ecosystem. We reported the results of the multiple sources of evidence under three aggregate dimensions: 1) A central mediator as enabler of business relationships in the healthcare ecosystem; 2) Digital business model and ridesharing services in healthcare; and 3) Value co-creation in the multi-stakeholder ecosystem.

4.1. Digital business model for ridesharing services in healthcare

The SE platform also enables the re-conceptualization of the portfolio of services for stakeholders involved in the ecosystem through a digital business model (DBM). By enlarging their services, HOs can provide patients complete assistance during their health journey. Indeed, the proposed DBM includes the following ridesharing services accessible through the digital platform:

- NEMT services: this ridesharing service is carried out by ambulance. It can be available for patients who have to make admissions to healthcare organizations, hospital discharges, specialist visits, diagnostic tests, therapeutic treatments, radiotherapeutic and chemotherapy treatments, and any other's needs.
- Disabled transport: this transport is carried out by shuttling with an electric platform. It can be provided both in the health and tourism sector (e.g., Saluber totems are installed in the port, airport and train

station) but only for tourists with clinical or social necessities. The transport of disabled people aims to guarantee everyone the opportunity to travel, to discover new places and take part in events without encountering difficulties. The SE platform provides shuttles for special transport and assistant staff to improve the standards of the services offered and guarantee the simplicity of travel for disabled people and those with reduced mobility, also favouring accessible tourism.

- Home-care services: medical care, physiotherapy, home nursing service and social assistance. These services are delivered using qualified vehicles made available by the SE platform or healthcare professionals. The home-care services provide direct support to the patient, aimed at promoting daily self-sufficiency, nursing and rehabilitation assistance. This type of service is provided for elderly dependants, for patient discharging from health facilities, for disabled, and for any other person who is experiencing a reduction in temporary or permanent self-sufficiency and needs professional support to perform drug therapy or home rehabilitation.

We reported a sentence from one of the healthcare professionals during the third focus group: *"If you have a sick people, like a grandfather or a family member, Saluber can send you a person who does H24 assistance. This digital app helps to improve patient well-being with assistance understood at 360° In a wider futuristic vision, Saluber could be the answer to everything concerning health"*. Thus, the SE platform expands the range of services for HOs in the health logistics network and supports the activities of each actor. The intermediary centres have two great advantages: the fee paid and the technology made available by Saluber DBM. The carriers can benefit from a fee for each transport booked, thus increasing their earnings. They are contracted by the central mediator of the SE platform, with pre-established tariffs, which consist of the consultancy fee and the rate per kilometre. For instance, Saluber provides, free of charge, smartphones to the carriers. The platform does not have the exclusivity of these actors because they make their resources available when they are not engaged in their business. Therefore, the gain for the carriers derives from the sharing of their own resources. The ridesharing service is provided according to the criterion of the nearest carrier. For the geographic distance, a range of 10 km of proximity of the carrier to the place of intervention is respected. Through geolocation, the carrier available and closer to the search position is activated in real-time, the intervention costs are optimized, and the market prices are uniform with respect to the sector services. *"The 280 interventions carried out with Saluber in the month of March refer to still telephone calls but treated through the App and, therefore, geo-referencing vehicles and men in real time. Our service is focused on quality and timing. Saluber allows patients to book health and social services carried out by accredited operators in a practical, fast and traceable way through the geo-localization system installed on carriers. So, the vision is to make healthcare accessible to all, while the mission is to be the first Italian access provider to health systems through high-tech media"* (Saluber Project manager interview).

Furthermore, Saluber DBM allows each actor to keep track of the service and of the vehicle, allowing the reallocation of dead spaces that would otherwise be a pure cost for the company. At the time of booking the service, a link is sent to the patient who is connected to a dynamic map in real time. In this way, the patient can also keep track of the service; indeed, the traceability of the ride makes the service safe. *"The problem of transport carrier's system in the healthcare sector lies in the scarce traceability of the vehicles, in the prices often not aligned with the market, and in intervention time hard to assess. All this creates a state of anxiety in the patient. With Saluber you have a real evolution thanks to a reliable and high-quality service"* (Carrier 1 focus group).

4.2. Value creation, delivery and capture for the various stakeholders

The centrally mediated platform based on the principles of SE groups different actors with different backgrounds and positioned at various

levels, who jointly take part in the healthcare services provided to the patients. Indeed, this digital platform creates and delivers value by enabling business relationships among four different actors involved in the ecosystem:

- (1) Intermediary centres: they include private clinics, diagnostic centres, primary care physicians, pharmacies and points of tourist interest, such as ports, airports and stations addressed to tourists who need clinical and social assistance;
- (2) carriers: they represent companies that have a sanitary vehicle fleet. The sanitary means are both ambulances for non-emergency transport and shuttles with an electric platform for the transport of the disabled. Carriers bring into the network both their own vehicles and their personnel. The staff of these companies consists of drivers and rescuers;
- (3) healthcare professionals: they are doctors, nurses, physiotherapists and health workers;
- (4) Public utility companies: they represent private firms managing public services in regional bodies as EAV (<https://www.eavsrl.it/web/>), a historic hydroelectric company of the Campania region that has expanded their activities to public transport systems. As affirmed by the president of EAV: *“The agreement between EAV and the Bourelly Group was signed for the activation, on an experimental basis, of the on-call transport service through Saluber platform dedicated to travellers with disabilities on the Naples - Sorrento Vesuvian line”*.

This active participation means that decisions of the actors involved in the ecosystem provide legitimacy to the acquisition of new value practices within HOs. The SE platform affects the healthcare network both at a specific level (es. regional bodies) and/or at a system level (es. government agencies). As described above, through the creation of a digital network, it is possible to deliver value to the stakeholders involved through different health ridesharing services quickly and easily. *“Saluber is a solution that puts the healthcare organizations in a network, through the sharing of resources. As these healthcare organizations do not provide the same services, they may have difficulties in managing the patient between them, and therefore need the patient to use the transport service”* (Intermediary Centre 1 focus group). Additionally, the Marketing Manager of Saluber remarked this aspect: *“Saluber provides those who became a part of the network a highly competitive advantage, generating value for them”*.

The criterion adopted for the management of health logistics is that the vehicle/professional closest to the request, aimed at reducing waiting times in order to deliver value alike to all the various stakeholders. The service booking is simple and fast: the request generated by the intermediary centres via the app is sorted to the nearest carrier, so the patient can reach the desired place in a short time, using qualified vehicles and personnel. An additional benefit derives from the technology. A centrally mediated platform such as Saluber offers, free of charge, tablets to the intermediary centres for service booking, so they have no service adoption costs.

4.3. Value co-creation in the multi-stakeholder ecosystem: patient centrality

The central mediator of the SE platform acts as a facilitator for the exchange of value among HOs implicated in ridesharing services for NEMT. The solutions proposed by the DBM have promoted the creation and delivery of value by enabling the business relationships between various stakeholders and the participation of the community of the healthcare ecosystem. Specifically, the new digital network of ridesharing services has helped to improve clinical, transport and financial outcomes for many partners of the health system and has contributed to co-creating, delivering and capturing value in the overall patient experience for those who benefit within the network. Indeed, each actor

interviewed in our study showed the co-created value within the network in terms of greater efficiency, lower costs and service speed.

Furthermore, close cooperation is essential between doctors, patients, intermediary centres, carriers and public utility companies within this multi-stakeholder ecosystem. Such collaboration is especially important in terms of involving healthcare users in defining a reasonable time period for the implementation of ridesharing services. The SE platform is an orchestrator of value created, delivered and captured by the actors involved. Indeed, in addition to providing a more effective solution for transport and a better health life experience for patients, this centrally mediated platform is a substitute for fragmented health services that have shown severe effects on patients' health. According to the actors involved in the network, by eliminating/reducing the severe effects, the new digital platform can reduce the costs for the multi-stakeholder ecosystem related to transport and contribute to value co-creation. Thus, the focus is the need for interaction and cooperation between different actors to share the necessary resources and competencies to co-create value. *“Using Saluber you are sure to have specialized professionals and a quality carrier at your disposal. Saluber is a cuddle you make yourself at 360° It is necessary to create the relationship among the patient and the actors who participate in the network. If the patient feels comfortable, he will choose Saluber again, and this creates value for all the healthcare organizations of the network”* (Saluber Project manager interview).

Through information shared within the community, it is possible to know the patients and provide them with individual care. Saluber follows the patient journey and the personalization of his care. The service provided is unique, but the management of the service is personalized based on the patient who requests it. *“Saluber is health. We do not see patients as numbers but as persons. If you use the service a second time, we already know who you are, what pathology you have, which treatment plan you follow. We monitor everything at 360°”* (Saluber Marketing manager interview).

Saluber fits into the current context with a great social role focusing attention on patient centrality. *“We are sentinels on the territory, the patient comes to us asking for everything. The more services offered, the more the patient feels connected to us. Disabled and elderly people are often abandoned to themselves. Saluber is a broad discourse, and there is the social part on which they are pushing”* (Intermediary centre 4 focus group).

Therefore, the patient's journey is reinvented because it establishes a direct link between the various stakeholders involved to help patients reach their destination at the lowest landed cost, with the shortest possible lead time and in premium condition. *“In the future, Saluber will offer a very wide active network, with the availability of so many vehicles and personnel to cover the demand on the whole national and international territory”* (Saluber CEO interview).

4.4. The effects of digital business models on the design of sharing economy solutions for healthcare services

Our results highlight the relevance and effects of the DBM approach to the design of sharing economy solutions for healthcare services by showing the dynamics that lead to the co-creation of value within the multi-stakeholder ecosystem. Fig. 2 shows the service value drivers that derive from the use of the digital platform (e.g., resource sharing, care personalization). These drivers entail benefits for each HO (single level) participating in the network and outcomes for the community of the health system.

Starting from the service value drivers, these centrally mediated platforms aim to innovate the current healthcare logistics in this complex context, bringing together several actors in a single, large digital multi-stakeholder ecosystem through resource sharing and professional support H24. Digital network participation improves healthcare professionals' activities, supplying them with the information required to identify, through technological tools based on geolocalization, the best allocation available for a given patient.

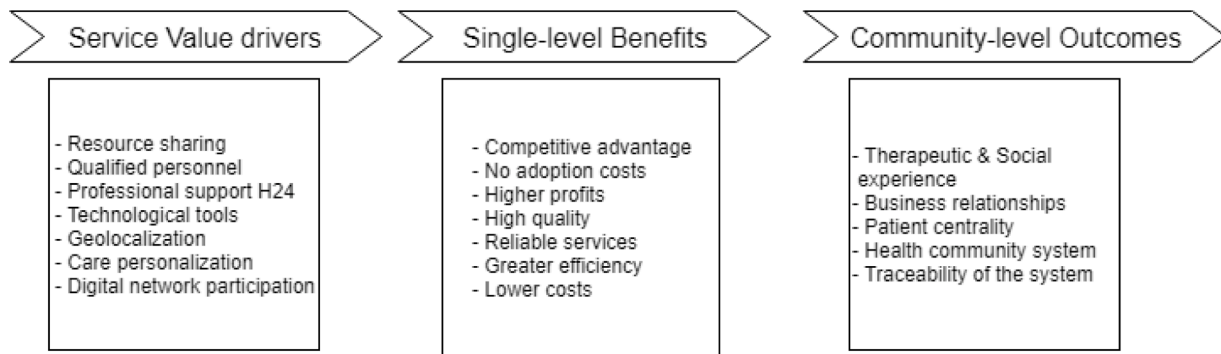


Fig. 2. Value co-creation drivers, benefits and outcomes.

Referring to the single-level benefits and community-level outcomes, a centrally mediated platform can provide actors with a more effective competitive advantage and patients with a better therapeutic and social experience. These digital solutions can also improve the efficiency of the whole healthcare network by chaining the design of the different healthcare activities and how the activities are performed through reliable services. Value co-creation among HOs occurs mainly for two reasons: first, the patient feels more connected to the structures that offer him the service; second, these organizations have a gain in monetary terms and an increase of their service offerings and no management and adoption costs.

For instance, in the DBM of Saluber, the patient buys healthcare services through the nearest intermediary centres. Thus, the centre acts as an intermediary; in other words, it sells the Saluber service to patients and has an 8% commission on the price paid. If, instead, the intermediary centre is charged directly for the cost of the service and becomes a Saluber customer, it is granted a 20% discount on the cost of the service. Booking a transport service on behalf of the patient allows the intermediary centre to offer an additional service and has a competitive advantage over other HOs. By expanding the range of services offered, intermediary centres will be able to extend their ability to acquire users. In this way, they have the opportunity to increase their business. *“The advantages I see are the traceability of the system and the possibility of using a transport service only when requested by the patient, thus reducing fixed*

costs” (Intermediary Center 3 focus group).

For these reasons, the relevance of DBMs to the design of sharing economy solutions for healthcare services is centred on the patient’s needs. The effects of the SE platforms are based on the quality of the service through the check of the customer service that can contact the patient to monitor the journey. At the end of the ridesharing service, an evaluation questionnaire could be sent to the patient to assess the condition of the vehicle, the treatment received by the professional and the service in general.

5. Discussion and implications

In many sectors, particularly in healthcare (Hwang and Christensen, 2008; Elton and O’Riordan, 2016; Wang, 2018), firms are rearranging their business models from a digital perspective (Bouncken et al., 2019). Our analysis focuses on value co-creation dynamics within digitalized multi-stakeholder ecosystems such as healthcare by fully exploiting the principles of SE (e.g., Breidbach and Brodie, 2017; Täuscher and Laudien, 2018). Our study shows how value is created, delivered and captured for the various stakeholders involved in the organizations, which do not have experiences in SE and DBMs (see Fig. 3). We also contribute to the Frow et al. (2014) study about co-creation practices in the healthcare ecosystem by adding a digital perspective of value co-creation dynamics among various stakeholders managed by an SE

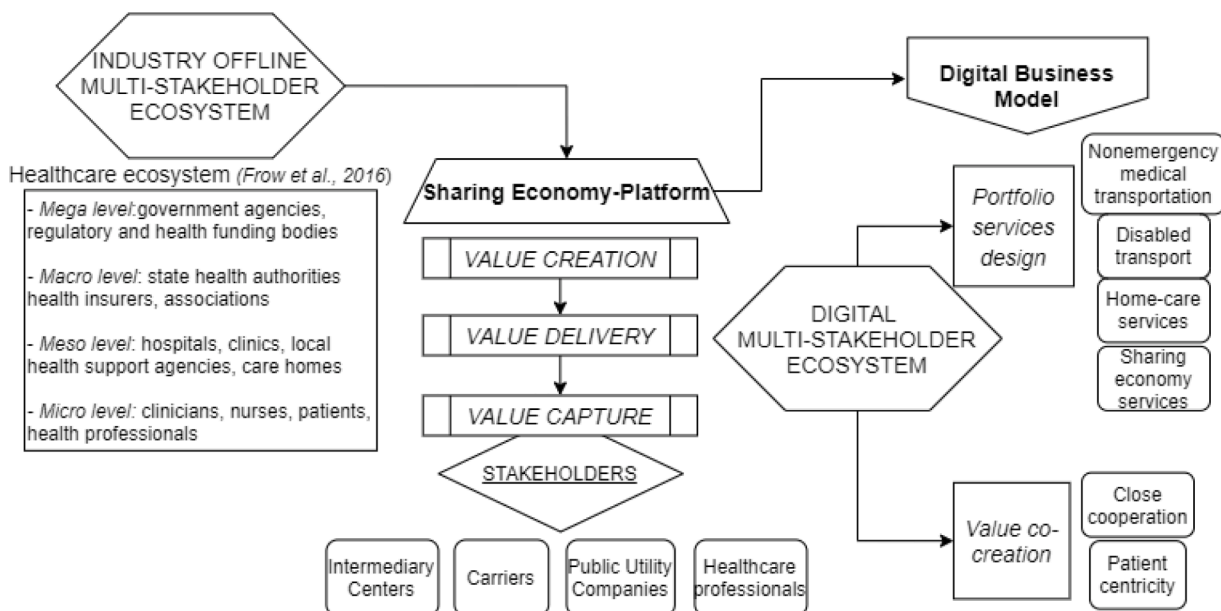


Fig. 3. The multilevel framework about how value is created, delivered and captured for the various stakeholders in the SE platform within the healthcare ecosystem. Source: Authors’ research.

platform. Given the difficulty of improving care services within a multi-stakeholder ecosystem and the inherent challenges of organizing multi-stakeholder relationships, it may be useful to have central mediators of an SE platform to set up DBMs able to create and deliver value to manage complex ecosystems made out of various types of stakeholders.

A multilevel framework of healthcare ecosystem rearranging was developed, which expands the value co-creation process beyond collaboration among various types of stakeholders in the ecosystem (Pera et al., 2016; Reypens et al., 2016; Ciasullo et al., 2020) and emphasizes the outcome of the digitalized network. Fig. 3 shows how value is created, delivered and captured through a centrally mediated platform based on the principles of SE and how different customers in the healthcare ecosystem (i.e., hospitals, healthcare professionals, patients) co-create innovative solutions between the digital multi-stakeholder ecosystem and the industry offline multi-stakeholder ecosystem. This framework also demonstrates the reconceptualization of the range of portfolio services offered to end users (e.g., NEMT services, disabled transport, physiotherapy treatments and so on). Thus, the findings of the qualitative study show, on the one hand, a new perspective of value delivery among different types of stakeholders positioned at various levels in the existing and heterogeneous offline healthcare ecosystem. On the other hand, the creation of a digital business network helps to improve the types of relationships between the different stakeholders involved in the platform virtual context.

The results of this study highlight the participation of five main actors: 1) intermediary centres, 2) carriers, 3) healthcare professionals, 4) public utility companies and 5) central mediators of the SE platform. Focusing on the role of the SE platform, the different actors improve their internal processes by capturing the value through DBMs and by cooperating with other actors within the multi-stakeholder ecosystem. The re-conceptualization of the portfolio of services offered four different types based on the principles of SE: 1) NEMT services, 2) disabled transport, 3) home-care services, and 4) SE services. Through participation in the SE platform, the multi-stakeholder ecosystem has endless possibilities of enlargement. More organizations will participate in the health community, more will be the services offered and more actors capturing value taking advantage of the network benefits.

Close cooperation and patient centrality prove useful not only for the improvements of ridesharing services but also to create value within the network community. Finally, and coherently with Pera et al. (2016), we integrate the elements for value co-creation in a multi-stakeholder ecosystem by better detailing the digital perspective and the heterogeneity of the stakeholders of the healthcare ecosystem in line with the principles of SE. Furthermore, the case study findings demonstrate that the actors in the healthcare ecosystem can produce high-quality service solutions by considering the digitalization of their business models (Bouncken et al., 2019).

The proposed DBM by the SE platform is aimed at obtaining a higher degree of homogeneity among stakeholders regarding their knowledge about the new ridesharing services' features and their evaluation. For instance, the community level effect of Saluber is a clear advantage of these ridesharing services for NEMT that should facilitate the capture of value and the diffusion of the DBM. Firms promoting an innovation in a health market face several difficulties due to the different absorptive capacities of some user categories. For instance, elderly people who have limited technological knowledge should be helped and directed to the use of these digital platforms. One of the potentials of the SE platform and its related DBM for HOs has highlighted the importance of having in the department-specific organization units to deal with the process of adoption and diffusion of non-emergency and low-end healthcare services.

Thus, the results of our analysis also complement and support the previous studies that deal with a still underexplored topic of ridesharing in healthcare (Powers et al., 2016; Detsky and Garber, 2016; Chaiyachati et al., 2018; Apte and Davis, 2019; Rochlin et al., 2019). Furthermore, SE realized in the multi-stakeholder healthcare ecosystem

is considered a set of elements that encourage the exchange of value by the different stakeholders within the digitalized context. This implicates a prior study of the institutional context to put into practice the right strategies considering the various actors positioned at different levels.

Our study also offers implications for managerial practice as well as limitations and possible future research, which we argue further below.

5.1. Implications

Our work provides some implications for scholars and practitioners. The case study explores the value creation, delivery and capture for the various stakeholders involved in a DBM arranged for ridesharing of NEMT.

Referring to the theory, we provide a detailed perspective on how various stakeholders interact for value co-creation within the healthcare ecosystem. A newsworthy implication for scholars of SE-driven value co-creation in B2B ecosystems is that the DBMs and exploitation of such solutions cannot happen without considering the issues of creation, delivery and acquisition of data by various stakeholders. Therefore, value co-creation in such a multi-stakeholder context is inevitably related to sharing economy theory. For these reasons, within this digitalized network driven by SE-based platforms, the provider can sustain value delivery and capture via DBMs across different stakeholders involved in the ecosystem (Richter et al., 2017; Munoz and Cohen, 2017; Apte and Davis, 2019). Thus, scholars in this field should take into attention that only the adoption of single-level benefits and community-level outcomes can support a systematic observation of the business relationships among healthcare actors.

Referring to practice, we particularly emphasize the role of centralized mediators in the ecosystem, which allows participants to access shared value. Healthcare practitioners can benefit from our study by analysing the success practice of such business initiatives, which largely depends on the centralized mediators' ability to establish value co-creation dynamics among the various stakeholders participating in the ecosystem. Through analysing this case, we sought to better understand how healthcare organizations can leverage the value created and delivered on the SE platform to achieve a competitive advantage in this complex context.

We outline that HOs can begin to foster the emergence of an SE platform through a third-party centralized mediator. Thus, HOs do not necessarily need to invest in infrastructure. The arrangement of ride-sharing services is an interesting business opportunity for the entire health ecosystem and not only for the single service provider in capturing value. Participation in the ecosystem through the SE platform provides single-level benefits in terms of greater efficiency, lower costs and speed of service. This active collaboration allows a reconceptualization of the health ecosystem industry by chaining the design of the different healthcare practices and how the activities are performed.

HOs can expand their range of services through SE platforms. For example, in the specific case, the intermediary centres offer not only care services but also transport services. From a broader perspective, at a mega level, government agencies could use the digital network to encourage the exchange of information between actors. In conclusion, we derived a multilevel framework to understand how central mediators of the SE platforms and different actors in the healthcare ecosystem co-create value between the digital multi-stakeholder ecosystem and the industry offline multi-stakeholder ecosystem.

5.2. Limitations

Our research has provided a better understanding of how value is created, delivered and captured for the various stakeholders in a centrally mediated platform through DBMs. However, like any other study, ours has several limitations. The primary limitation refers to the case study context. More precisely, this paper sheds light on the extreme case

of a digital platform offering ridesharing services in the Italian healthcare logistics market. The specific characteristics of the geographical setting may have introduced a bias, making the findings at least partly unsuitable for application in other countries. Although the Campania region provides a powerful case study setting, further studies will have to validate our results in other contexts and derive conditions for generalizability of the implications. The second limitation of this study concerns the small number of actors involved in the analysis. The interviews were conducted with Saluber's top management members, and the focus groups involved three groups of participants (carriers, brokerage centres and healthcare professionals). This limitation could lead to a limited view of the phenomenon under investigation.

Furthermore, a broader consideration of the types of co-creation practices is needed. In this study, we identify the re-conceptualization of the portfolio of services by only considering four types of SE-based services. However, it must be considered that through the SE platform, the multi-stakeholder ecosystem has infinite possibilities to enlarge. As ecosystems change and evolve over time, future research could target more complex and varied models of sharing and integrating resources within healthcare and other sectors. It might be interesting to identify how the activities and interactions of value co-creation change over time and measure their impact on the relationships between actors within an ecosystem.

6. Conclusions

This paper shows the importance of the value created, delivered and captured through DBM based on the SE platform within the healthcare multi-stakeholder ecosystem. The proposed multilevel framework shows value delivery with the arrangement of ridesharing services from a digital perspective as an interesting business opportunity to co-create value within the entire health community and not only for the single service provider. A DBM allows co-creation of value thanks to the close cooperation of the stakeholders involved and focuses attention on the patient's needs. Indeed, we implemented our analysis starting on the DBM and SE literature to comprehend the state of the art and to contribute by focusing on the exchange of value in multi-stakeholder ecosystems, trying to understand two different types of healthcare ecosystems and classify them into a homogeneous part that shapes the phenomenon of SE and its value in management studies.

The implementation of ridesharing services requires the organization and coordination of an ecosystem of heterogeneous actors managed by the platform mediator. For instance, in the Uber system, the stakeholders involved are a) the group of economic actors that developed and manage the platform with a specific value proposition, b) drivers and prospective passengers who use the app, who accept the value proposition of the platform, c) Uber drivers who offer their cars and time to satisfy the transportation needs of prospective passengers, d) Uber passengers who accept the value proposition from Uber drivers and, finally, e) third-actors such as the media and policy regulators. All these types of actors engage simultaneously in the offering and acceptance of value propositions throughout a dynamic process that is facilitated and enabled by a digital platform.

This digital perspective, more than others, acts as an enabler since the research into how value is created, delivered and captured through DBM based on SE principles and inserted in a multi-stakeholder ecosystem such as in healthcare establishes one of the basic starting points of theoretical speculations. Indeed, participation in the digital healthcare ecosystem allows the re-conceptualization of the portfolio of services for HOs, expanding the catchment area. On the other hand, the DBM provides a fast and efficient exchange of information among different stakeholders involved in the digital ecosystem. For these reasons, it is fundamental to identify suitable mechanisms of value co-creation for all the set of business partners involved in ridesharing services for NEMT to allow overlapping and integration between the two types of ecosystems (online and offline).

Therefore, the article has tried to analyse in a generalizable perspective the support of a central mediator of the SE platform by exploring the DBM within the healthcare ecosystem to understand the value co-creation among various stakeholders involved. The study has several managerial implications that can be valuable for HO practitioners to understand how to arrange their ridesharing services for NEMT. Future research can be developed by considering the perspective of highly reputed regulatory players such as government agencies, scientific societies and other decision makers to understand the institutional idea about the digitized healthcare ecosystem. HOs could increase the credibility and relevance of their shared activities about the economic and experiential advantages of their digital services proposed by a central mediator of the SE platform capable of creating and delivering value to the different stakeholders involved in the ecosystem.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.techfore.2021.120647](https://doi.org/10.1016/j.techfore.2021.120647).

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