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Value capture and embeddedness in social-purpose-driven ecosystems. A multiple-case study of European digital healthcare platforms

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ABSTRACT

We aim to answer the question of the effect of a social-purpose-driven ecosystem on value capture from digital health platforms. We call the social-purpose-driven ecosystem a phenomenon which seeks social impact before profits and aims to empower citizens for individual and collective well-being. Thus, capturing value from digital platforms embedded in a social-purpose-driven ecosystem fundamentally differs from profiting from purely commercial digital platforms and poses significant challenges to platform owners and public policy. Previous research has focused mainly on profiting from technological innovations but has yet to consider the contextual role of the social-purpose-driven ecosystem. We applied the Profiting from Innovation (PFI) framework to fill this gap. Furthermore, based on the results of the multiple-case study of five European digital healthcare platforms, we extend the PFI framework. As a result, we define four unique contingencies which enable value capture from digital healthcare platforms embedded in a social-purpose-driven ecosystem: 1) multilayer value creation, (2) multipurpose complementary assets, (3) emerging dominant design, and (4) distributed socio-economic returns mechanisms.

The study offers two managerial and policy contributions. First, it calls on platform owners and policymakers to acknowledge the contextual effect of a social-purpose-driven ecosystem. Second, multilayer value creation, multiple complementary assets, dominant design and distributed socio-economic returns mechanisms can positively affect capturing value from digital healthcare platforms.

1. Introduction

Digital technologies, such as artificial intelligence (AI), cloud computing, the internet of things (IoT), virtual and augmented reality, blockchains, and connectivity technologies like 5G, create many opportunities for the healthcare industry (e.g., Rippa and Secundo, 2019; Cohen et al., 2017; Horoshko et al., 2021; Secinaro et al., 2021; Presch et al., 2020; Shaygan and Daim, 2021). Organisations can deploy new functionalities and thereby create new products and services. For example, by bundling several digital technologies into a defined structure, a platform becomes an ecosystem for technological and business innovations (Hermes et al., 2020).

The body of knowledge on digital platforms is robust. Recent research has emphasised: (1) the role of the platforms as intermediaries for transactions among different parties who benefit from the growth of both sides (e.g., Hagiu and Wright, 2015); (2) direct and indirect network effects and the specific characteristics of the different sides (e.g., Rietveld and Eggers, 2017; McIntyre and Srinivasan, 2017; Parker

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and Van Alstyne, 2005; Gawer, 2014); (3) the role of loyalty and strong ties among platform users and different sides more generally (e.g., Afuah, 2013; Fuentelsaz et al., 2015); (4) compatibility across the evolving technologies, different generations of platforms and multiple platforms and leveraging users across all these changes (e.g., Kretschmer and Claussen, 2016; Eisenmann et al., 2011; Cennamo et al., 2018; Özalp et al., 2018); (5) the architecture of a platform, its modularity and its governance (e.g., Gawer, 2014; Anderson et al., 2014; Tiwana, 2015; Cennamo et al., 2018); and (6) the application of emerging technologies like AI for network analytics and for mapping the interdependence of components and the dynamic nature of platform technology (Shipilov and Gawer, 2020; McIntyre et al., 2020; Drago et al., 2021). McIntyre et al. (2020) note that although recent research has significantly enhanced our understanding of different types of platforms and their evolution, still, due to the variety, complexity and dynamic nature of the platforms, issues relating to their business models – organisational boundaries, governance mechanisms, scope, the antecedents and characteristics of the mutual interdependence of different sides in creating and capturing value, and the dynamics of the interplay between core platform technologies and complementors – remain unresolved.

Kapoor and Teece (2021) identified three essential features of technology concerning value creation and capture: emerging, enabling and embedded. A platform, being a bundle or set of ever-advancing technologies (some of which might have an emerging nature), meets, in essence, two of these three features: enabling and embedded. Through continuous development, the enabling nature of a platform can spawn a wide range of applications and complementary innovations. Besides, the embedded nature of a platform prescribes its success based on the adopted business model and the ecosystem it operates. Kapoor and Teece (2021, p.2) state that "the enabling feature captures the impact of any technology as it relates to the multiplicity of applications that the technology can spur over time while" recognising the need for extensive coordination and specialised investments across the different applications for that potential to be realised. The embedding feature captures the surrounding business model and the ecosystem encompassing a technology's commercialisation while recognising the need for alignment within the complementary activities and technologies for innovators to derive value from the focal technology."

Thus, we argue that capturing value from digital platforms embedded in a social-purpose-driven ecosystem fundamentally differs from profiting from purely commercial digital platforms and poses significant challenges to platform owners and public policy. We define a "social-purpose-driven ecosystem" as a set of interconnected and interacting for-profit and non-profit organisations – enterprises, social enterprises, public, nongovernment and sometimes government organisations whose business models address social needs, concerns and missions (e.g., Crutchfield and Peterson, 2016; Tsai et al., 2020; Kim and Lee, 2019). In a social-purpose-driven ecosystem, actors vary in the degree of: 1) autonomy from national governmental affairs, 2) profit reinvestment into social needs and missions, and 3) customer expectations for public services. However, the "social" in a social-purpose-driven ecosystem reflects that the object of the ecosystem is a phenomenon which has social impact as an ultimate goal, aims to empower citizens for individual and collective well-being and focuses on supporting and working with grassroots or "bottom-up" communities of users (e.g. Stokes et al., 2017; Avelino et al., 2019). "The "social" relations or practices do not indicate any teleology or beneficial nature of innovation." (Avelino et al., 2019, p.197).

The central object of healthcare is the patient and their relationship with the doctor and medical staff that is directly entailed. It corresponds directly with the "social relationships" concept – when "users and communities collaborate using digital technologies to co-create knowledge and solutions for a wide range of social needs and at a scale and speed" (Stokes et al., 2017, p.10). Thus, the centrality of the patient and doctor in a social-purpose-driven ecosystem makes value capture from digital healthcare platforms *in essence* different from purely commercial digital platforms.

Some theoretical and empirical research on platforms' value capture has been conducted on private for-profit business sectors and reflects the behaviour of post-industrial organisations (e.g., Hein et al., 2019; Van Alstyne and Parker, 2017; Gambardella et al., 2021), which has left a significant knowledge gap about digital platforms value capture within a social-purpose-driven ecosystem, such as healthcare, education and government services.

To fill the gap, we seek to answer the research question - what is the effect of a social-purpose-driven ecosystem on value capture from digital health platforms? Thus, the aim of the paper is to explore the effect of a social-purpose-driven ecosystem on capturing value from digital healthcare platforms.

To meet the aim, we have adapted and deployed the profiting from innovation (PFI) framework (e.g., Teece, 1986; 2006; 2018), which we believe is relevant for analysing the value created and captured in social-purpose-driven ecosystems. Furthermore, we have adopted the qualitative method and multiple-case study research design (Eisenhardt, 1989; Gioia et al., 2013; Yin, 2003). We have gathered data from multiple sources (interviews, publicly available documents and archival data) on five digital healthcare platforms that provide remote healthcare services in five European countries (Finland, France, Lithuania, Spain and Sweden).

Our study makes a threefold contribution to the prior PFI and platforms literature. First, we bring forward the concept of a social-purpose-driven ecosystem, which well explains the behaviour of the business sectors that put social impact before profit, e.g. healthcare, education, and government. The study results assist healthcare policymakers, providers and healthcare-related private companies (e.g. MedTech) to fundamentally understand the origins and necessity of value-based healthcare, which is now empowered by digital technologies. In order to maximize the value of healthcare, all social-purpose-driven ecosystem stakeholders need to jointly orchestrate the quality, accessibility and costs of care in an optimal way to avoid an unbearable burden for society.

Second, we propose four unique PFI components that are significant while capturing value from digital healthcare platforms embedded in a social-purpose-driven ecosystem: 1) multilayer value creation; 2) multipurpose complementary assets; 3) emerging dominant design, and 4) distributed socio-economic returns mechanisms. Digital platforms operating in the healthcare sector are expected to aid in orchestrating value-based healthcare for the benefit of society. Thus, the four identified components urge platform owners to pay attention to multiple stakeholders and the multilayer value they can harvest from the platform. Furthermore, complimentary intangible assets (e.g. networks) play an important role in value creation and capture from digital healthcare platforms. Moreover, platforms supporting technological interoperability and modular architecture can efficiently create multilayer value and intangible assets by "vertical integration". Finally, diverse platform modules account for various social and economic benefits and, thus, can be funded by private and public sources, which ensures the sustainability of the digital healthcare platform.

Third, we empirically explore the significance of the embeddedness feature of digital healthcare platforms. Our findings advance digital platforms literature and the PFI framework by spotlighting how citizens/patients and social structures such as social-purpose-driven ecosystems shape the use of digital technologies. The study advises healthcare policymakers, providers and other stakeholders that technological embeddedness is an essential factor in explaining why digital healthcare platforms' performance has been unsatisfactory low. Digital platforms are the product of a socio-political process resulting in rules and resources immersed in the technology. Furthermore, human interactions create digital platforms, which, in turn, influence each citizen/patient and other stakeholders' behaviour. Thus, healthcare as a social-purpose-driven ecosystem is a complex and heavily regulated social structure that imposes rules and resources that currently do not

favour the sustainable scaling of digital healthcare platforms.

The paper is organised as follows. First, the theoretical background provides insights into the specifics of the digital transformation of a healthcare system as a social-purpose-driven ecosystem. Next, we define a digital healthcare platform in relation to the advanced functionality and accountability of healthcare empowered by digital technology. The following section reviews the PFI framework to adapt it to social-purpose-driven industries. Next, we discuss the socio-economic value captured from digital healthcare platforms. Then, we illustrate the conceptual model developed with multiple digital healthcare platforms case studies. Finally, based on abductive reasoning, we provide propositions and suggest additional research questions that investigate the effect of the embeddedness of a platform in a social-purpose-driven ecosystem.

2. Theoretical background

2.1. Digital transformation in the healthcare industry as an example of a social-purpose-driven ecosystem

Globally, healthcare systems are in the middle of a significant change driven by ongoing digital transformation (Massaro, 2021; Biancone et al., 2021). Advances in the collection and intelligent analysis of massive amounts of data have opened up new possibilities in disease prevention and care. Digital technologies are moving some care from hospitals to homes (Olivero et al., 2019; Gualano et al., 2017; Fournier et al., 2020). Moreover, the wide-scale availability of medical data and decision-support solutions is changing the role of citizens/patients and medical professionals (Sousa et al., 2019; Madhavan et al., 2021).

One term used to describe the ongoing transition is P4 medicine, initially coined by Hood (2013). The four P's are: predict, prevent, personalise, and participate. In P4 medicine, care is tailored to each individual based on massive amounts of medical data, which are now more readily available. P4 medicine is being driven by improvements in data analysis, machine learning, genome sequencing and sensing technologies. P4 medicine strongly focuses on prevention and individual and population wellness. Ideally, in P4 medicine, the disease is predicted before symptoms develop so that effective prevention, medication or another intervention is initiated before symptoms even occur. When the disease becomes prevalent, personal data can be compared to data from people with similar conditions and, thus, utilised to personalise treatment and medication (Hood, 2013; Sagner et al., 2016). Besides, P4 medicine relies on large-scale social participation to enable consumers via multi-sided digital platforms to collect data from multiple sources, especially genetic data, which are affordable due to the significant advances in efficiency and the reduced costs of genome mapping (Sagner et al., 2016).

Another important trend in modern healthcare is value-based performance, which emphasises the achievements and measurements of the actual value of the care provided to patients. In Porter and Teisberg's (2006) value-based model, the central goal is to maximize health and efficiency in terms of "health outcomes achieved per euro spent." In value-based healthcare, value is measured over the entire cycle of care during a patient's illness and includes recovery, rehabilitation and long-term health management. Universal and equitable coverage is also essential to ensure that healthcare is value-based and accessible to all citizens (Azzopardi-Muscat and Sorensen, 2019; Campra et al., 2021a,b; Wren and Connolly, 2019). Maximising value, in practice, is a difficult joint optimisation problem. The key factors are costs, quality of care and accessibility of care. Blindly maximising quality or accessibility can easily lead to unbearable costs for society. Thus, digital technologies and health data enable "accountability" as a precondition of value-based healthcare. To operationalise value-based healthcare, again digital healthcare platforms come to aid.

Finally, digital technology and remotely accessible health data enable healthcare providers to bring healthcare services closer to home and office, rendering healthcare proximity to the patient. "Proximity" is an important feature that creates value for the patient during pre-hospital, outpatient and post-hospital periods.

Fig. 1 summarises how digital technologies and health data add value by broadening the scope of the "functionality" of the healthcare provided by enabling P4 medicine, enhancing the "accountability" for healthcare outcomes, and increasing the "proximity" of healthcare services to patients and their homes. Digital technology enables the collection and analysis of the big data needed for early diagnostics, efficient treatment plans, and measuring clinical outputs and the patient experience. Measuring healthcare outputs paves the way for value-based healthcare, where results, rather than the process, are paid for. Finally, increasing the proximity of healthcare services to patients and their homes enables patients to save time and money in travelling to a healthcare provider. It also ensures timely healthcare interventions when necessary. Thus, Fig. 1 shows how digital technology, including digital platforms and health data, creates value in the healthcare system.

2.2. Defining digital healthcare platforms

Gawer (2014, p. 1230) defines digital platforms as "evolving … meta-organisations that: (1) federate and coordinate constitutive agents who can innovate and compete; (2) create value by generating and harnessing economies of scope in supply or/and in demand; and (3) entail a modular technological architecture composed of a core and a periphery".

Platform scholars argue that a digital platform is an open architecture with a governance model designed to facilitate interactions or mediate transactions (Gawer, 2014; 2022; Parker et al., 2016; Teece, 2018). The main goal of these platforms, also called transaction platforms,[1] is to generate interactions between groups of actors comprising consumers, producers, and third-party actors (Parker et al., 2016; Jacobides et al., 2018; Teece, 2018).[2] In this context, the physical assets or service provided is secondary. Rather, digital platforms set architectural and governance rules to balance platform control, engage participants and co-create value for one another (De Reuver et al., 2018 ; Parker et al., 2016; Ghazawneh and Henfridsson, 2013; Tiwana, 2015).

Fig. 2 illustrates the typical architecture and components of the digital healthcare platform. Digital healthcare platform is the integration of technologies, including electronic health records (EHR), assets and data processing capabilities, User Interfaces (UI) and Application

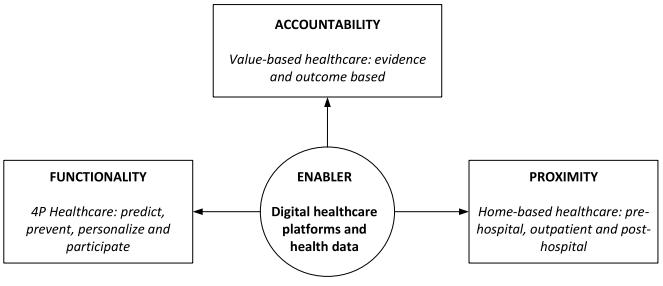

Fig. 1. Digital technology and health data as enablers of advanced healthcare services.

[1] unlike an innovative platform, for which the main goal is to orchestrate industry innovation by offering **technological building blocks** that are used by complementors to develop new products and services (Parker et al., 2016; Cennamo et al., 2018; Gawer, 2014).

[2] In this article, we will not pursue an engineering design perspective, focusing on a product's architecture and components (Gawer, 2014). Instead, we focus on the value created by and captured from the interactions that a platform unlocks.

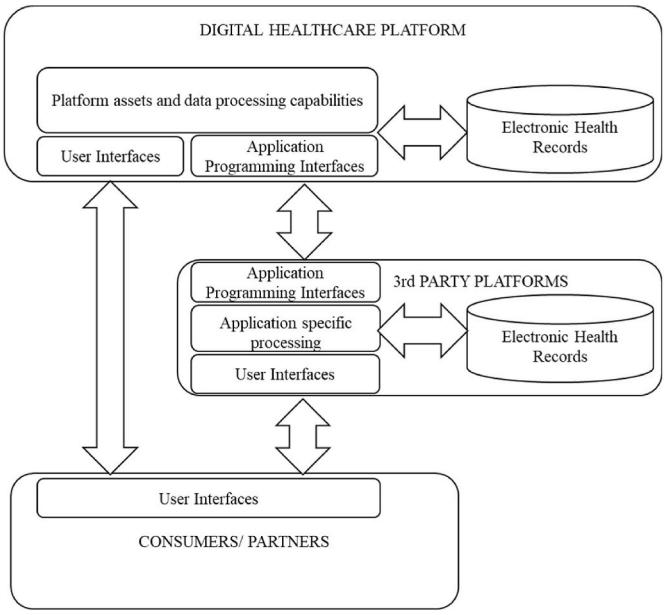

Fig. 2. Visualisation of the digital healthcare platform architecture and components from the technological perspective.

Programming Interfaces (API) to provide a customised, end-to-end healthcare solution and applications. Digital healthcare platform constitutes an infrastructure that facilitates two-way communication and information exchange between different consumers/partners such as medical professionals, patients, platform and third parties – e.g., application developers, relatives and caregivers. Consumers/partners can access the platform directly or through third-party platforms via user interfaces. Third parties access the platform through the standardised application programming interfaces. Arrows indicate two-way interaction between consumers/partners, third parties and platforms. (See Fig. 2.).

Value creation has a unique meaning for the healthcare industry. First, most studies on platforms have adopted the perspective of profit-driven firms (Teece, 2018). However, there are many calls for healthcare to consider value from a patient's perspective. The emergence of digital platforms has altered the way care is delivered. Such platforms have transformed the way people interact (e.g., Facebook), search for information (e.g., Google), buy products (e.g., Amazon) and utilise services (e.g., Airbnb) (Hermes et al., 2020). Complex, interacting, multi-sided markets are replacing traditional simple linear value chains of care with super-modular/super-additive value creation (Jacobides et al., 2018; Clemons, 2018; Hermes et al., 2020).

Second, this shift has required the use of digital technologies (such as the IoT, big data analytics, AI, robotics, blockchains, additive manufacturing and cybersecurity) and raises a question about the confidentiality of the data and the confidence placed in health systems and professionals.

Third, by creating complex interacting multi-sided markets, the way traditional sets of individuals and organisations interact has changed (Blumenthal, 2011; Davidson et al., 2018; Hansen and Baroody, 2020). Traditional actors deal with existing physical care processes and services, which are becoming digital or are being replaced by new digital medical procedures. The actors involved in interacting to co-create value are patients (e.g., physical traits and medical history), professional groups (e.g., physicians, nurses, administrators and insurers), clinical organisations (e.g., hospitals, testing laboratories and care facilities), treatment options, healthcare delivery processes, regulators (e.g., state agencies, policymakers and credentialing entities), non-governmental organisations, new digital intermediary firms and finally, families (Fichman et al., 2011; Agarwal et al., 2020; Hermes et al., 2020).

Fourth, platforms also offer super-modular/super-additive value creation. From studying several digital healthcare platforms, Hermes et al. (2020) identified six new forms of value creation: (1) information services (e.g., access to communities, online learning platforms, doctor recommendations and online schedulers); (2) remote and on-demand healthcare (e.g., telemedicine providers, biomarker collectors and simple intelligent apps for self-care); (3) data collection (by home lab kits and mobile devices to create a blockchain-based personal health record); (4) market intermediaries (health e-commerce, e-prescriptions and healthcare planners); (5) data management and analysis for healthcare providers (e.g., intelligent population health management, intelligent diagnostics, cloud service providers, and augmented and virtual reality providers); and (6) investors and consultants (e.g., incubators and accelerators). All these new forms of value creation rely on the platforms' new types of digital interaction and allow new actors to emerge in the healthcare industry. Thus, the emergence of digital platforms in healthcare has influenced how value is co-created among multiple stakeholders and allows novel value to emerge (Sarker et al., 2012). Reflecting on value creation raises the question of the business model of healthcare platforms (Teece, 2018), especially since business models for digital platforms rarely emerge fully formed. Platform leaders must design, manage and alter the platform's architecture to discover the right way of capturing value from digital healthcare platforms (Helfat and Raubitschek, 2018).

The growth of a platform often relies on the network effect, which is a part of relational intellectual capital (Alfiero et al., 2021; Evans et al., 2015), and in which a product or service becomes more valuable as more people use it. Network effects have the unusual property that demand can become self-sustaining (Shapiro and Varian, 1999). As the user base increases, the more compelling the proposition becomes for attracting new users (Economides, 1996; Katz and Shapiro, 1985). Network effects explain, in part, the rapid growth of platform value (Cusumano et al., 2019). Thus, exploring what a patient-centric digital healthcare platform means, unpacking not only the actors and their interactions but also network effects.

Research has looked at the drivers that facilitate the network effect and, thus, the existence and growth of a platform (Cusumano et al., 2019). Adding information and fostering a community is critical (Van Alstyne et al., 2016). Whether the underlying information is user-generated or algorithmic content generated from user data, interacting with the platform creates value that attracts further interaction. In accounting, these network effects are intangible rather than tangible.

Applying the sociology of work and organisations reveals digital platforms' "boundary-spanning function" (Kislov et al., 2017; Lander, 2016). Platforms become integrated into the coordination and organising mesh in the formal organisational and household ecosystems they enter. Work occurs in both settings but under different conditions and authority relations. From this perspective, a platform can also add or simplify work in the contexts it enters. However, it is necessary to learn how to use it before it can be routinely used. An assessment of whether a platform is a welcomed asset or an alien nuisance and a stressor to be avoided is made in most contexts, which can be essential for its continued use after its initial adoption (Kim and Malhotra, 2005). Summing up, digital platforms are deeply embedded in the ecosystem through connected technologies (e.g. super-modular and super-additive), multi-sided markets, network effect and boundary-spanning function. In addition, healthcare adds a social-purpose-driven context and makes the ecosystem more particular, especially for capturing value.

2.3. Rethinking the PFI framework in the context of healthcare as a social-purpose-driven ecosystem

PFI (Teece, 1986) addresses a fundamental question – how to profit from technological innovation. The question is still valid concerning

digital platforms operating in social-purpose-driven ecosystems. Digital technology has inflicted radical changes on the object and process of innovation. Innovating software and the process of integrating different technologies is often much more important than hardware, device or equipment innovation. Although the logic behind innovations for a stand-alone product and digital services is significantly different, "the core independent variables in the PFI model – the strength of the appropriability regime, complementary assets, complementary technologies, standards (and associated installed base effects), and timing – are more relevant than ever for a world" (Teece, 2018, p.1369). Besides, the significant effects of an ecosystem and business models have been acknowledged as an integral part of PFI in explicating the success of digital innovation (e.g., Teece, 2018; Gambardella et al., 2021).

How to profit from *digital* innovation relates to standard PFI constructs. For example, protecting and managing intellectual property is necessary for preventing easy imitation. However, digital innovation, especially process innovation, has traditionally rarely been patentable, especially by the European Patent Office (EPO). On the other hand, the EPO (2019) reports that "ICT industries will continue to be among the most R&D-intensive sectors. The role of patents in promoting these technologies [e.g., AI and blockchain] is evident as they secure the investment needed for advances in this field. Using the stakeholder feedback obtained in 2018, *we will continue to further adapt our practice to the needs of the users to effectively* support *the development of ICT industries*."[3] Thus, the EPO is responsive to the need for a robust appropriability regime that prevents easy imitation and helps digital technology innovators to capture value.

In many industries digital multi-sided platforms prevail, and platform owners compete not just with a single service but with a portfolio of interconnected services and related ecosystems; thus, complementary and intangible assets help them to obtain vital resources and to manage the risk, costs and competition. Furthermore, complementors not only add value to a platform but also benefit through access to the customer pool, data or other assets that help to improve their complements.

However, in a social-purpose-driven ecosystem like healthcare platform owners, complementors, users and payers might follow different and sometimes conflicting missions (social good vs profits of the private owner) and have an indirect relationship: e.g., user and payer are two different entities. While complementarity and intangible assets retain the significance of their role, the public-private partnership brings new challenges.

The networked nature of digital innovation has enabled relatively effortless data collection, big data processing, and real-time connectivity and mobility. However, there are challenges with the timely standardisation of technology, APIs, data access and usage, and digital service delivery, especially in a highly regulated sector such as healthcare. In healthcare as a social-purpose-driven ecosystem regulatory burden and liability is very high. Thus, standardisation and certification of digital healthcare platforms run most of the time by publicly authorised institutions and do not keep pace with MedTech business expectations. This aspect also applies to access to and management of healthcare data.

In this context, value capture mechanisms and business models have to change. Hermes et al. (2020) provided more specifics to platform business models by posing the question: Which side should be charged? What is the best pricing strategy? How should switching and multi-homing costs be handled? How should a price for digital services be set if there are many diverse stakeholders? In social-purpose-driven ecosystems like healthcare, pricing and whom to charge are mostly regulated by the government or other authorised institutions. Besides, citizens always expect no or low co-pay for healthcare services. Thus, technological R&D-based digital healthcare services are expected to have low margins and, in the best case, profits reinvested into healthcare quality development.

The maturity of a digital entrepreneurship ecosystem is related to the availability of and access to the variety of relevant complements, the entrepreneurial efforts that create new practices within the ecosystem (e.g., a change to the EPO's attitudes towards patenting ICT inventions), access to data, and relevant rules and regulations that guide innovators through collaborative relationships in a complex and dynamic ecosystem (e.g., Nambisan, 2017; Elia et al., 2020). Digitalisation questions the critical elements for profiting from a platform, such as a network effect. Indeed, purely digital platforms are not tied to a particular type of hardware since the user can easily switch platforms. Thus, the network effect alone is not necessarily a long-term competitive advantage (Tucker, 2018). At present, a social-purpose-driven healthcare ecosystem is emerging, and most of the complements, architecture of the ecosystem, processes and regulations are pushed by entrepreneurial efforts and heavy investments. However, private and public actors in the healthcare ecosystem have different paces of change and the capacity to absorb innovations. Public actors' primary mission is to ensure healthcare quality in the most effective way (Secundo et al., 2019). The Social-purpose-driven performance mode leaves few resources to invest in developing and adopting digital innovations.

3. Methodology

Although there is some understanding of how the ecosystem affects the adoption of digital technologies, we still need to gain knowledge on the social-purpose-driven ecosystem as a phenomenon and its effect on value capture from digital healthcare platforms, which are also relatively new phenomena. Thus, we carry out an explorative multiple-case study approach to investigate a contemporary phenomenon of digital healthcare platforms within its real-life context, such as the social-purpose-driven ecosystem (Denzin et al., 2017; Eisenhardt, 1989; Miles and Huberman, 1984; Yin, 2003).

The research question and objectives determine the choice of method (Gaudet and Robert, 2018). The qualitative research approach aims to answer the "why" and "how" of the phenomenon under investigation (e.g., Yin, 2003). We aim to answer the research question, "what is the effect of a social-purpose-driven ecosystem on value capture from digital health platforms?". In answering the research question, we have two objectives to explore – what is the contextual role of embeddedness in a social-purpose-driven ecosystem, and how can digital platforms capture value embedded in a social-purpose-driven ecosystem? The questions "what" and "how" are exploratory, supporting the case study approach. Furthermore, the case study research aims to understand and explain, rather than measure the complex and dynamic phenomenon in its real context (Yin, 2003), what is in line with our research question and objectives.

Although it is possible to analyse a single case study, the aim of our study requires adopting a *multiple-case design*. The multiple-case study allows the observation of the presence or absence of similarities, especially in real-world cases and when results have contextual conditions (Eisenhardt, 1989; Yin, 2003), which obtained in our case as we explore value capture from digital health platforms embedded in a specific context of the social-purpose-driven ecosystem. In accordance, more recently, Eisenhardt (2021) stated that such a multi-case study approach is relevant when the research question is a black box, and there is little empirical evidence. In our case, we seek to fill in the gap on the effect of a social-purpose-driven ecosystem on value capture from digital health platforms.

Our literature review led to some propositions that indicated where to look for relevant evidence besides reflecting an essential theoretical issue (i.e., that specificities value capture from a platform in a social-purpose-driven ecosystem). For example, the profiting from innovations (PFI) framework explains that capturing value from technological innovations depends on the strength of the appropriability regime, ownership of complementary assets and technology, standards,

[3] https://www.epo.org/about-us/annual-reports-statistics/annual-report/2018/insights/patents-in-digital-technologies.html, accessed 6 April 2021.

business model, and getting the timing right (Teece, 2006, p.1138; Teece, 2018; Gambardella et al., 2021). As explained in our literature review, we expected to find an adaptation of these tenets in real-world cases when the digital platform operates in a social-purpose-driven ecosystem. The question was thus (1) whether we would find an adaptation of these tenets in each of our cases and (2) whether we would find a similar replication of the adaptation across several cases. Finding similar replications would generate empirical evidence of core components of value capture from the digital healthcare platforms embedded in a social-purpose-driven ecosystem and thus allow us to produce theoretical propositions (Yin, 2003). Massaro et al. (2019) also argued that the advantage of multi-cases is that they afford cross-comparative opportunities allowing researchers to discover new variables and complex processes within a social context. Besides, a multiple-case study increases the external validity of the conclusions (i.e., their generalizability) and extends the result's generalizability to a broader context (Yin, 2003). Our research question and objectives comply with the characteristics provided above and thus makes multi-cases an appropriate method for this study.

3.1. Research setting and case selection

Our multiple-case study design is based on a holistic unit of analysis, a digital healthcare platform. We also bound the case with several criteria to carry out analysis across the multiple digital healthcare platform cases. The platforms had to (1) be in the healthcare sector (a sector that by nature is a social-purpose-driven ecosystem; cf. literature review); (2) be in contexts considered similar but not in the same country (to reflect cross-country specificity); (3) to be a digital platform (to meet digital platform definition and aim to capture value for it), (4) developed by a start-up or small group of researchers (and not involve a big company as the goal is replication and not contrasting); (5) being considered a promising digital healthcare platform for that we looked for a platform with external recognition, such as winning innovation prizes or obtaining external funding.

We followed a two-step process to select our cases that would respect these bounding criteria. First, we selected the five countries (Finland, France, Lithuania, Spain, and Sweden) of the DiHECO project, European project funded by the Horizon 2020 programme to advance knowledge about digital healthcare platforms. Selecting countries belonging to this project ensures a spread of Northern and Southern, Eastern and Western European healthcare systems in which digital platforms are playing increasing roles. Table 1 is a detailed overview of the healthcare systems in the five countries. Analysis of the respective healthcare systems allows us to control the context of the study. Furthermore, the healthcare systems of the five countries are similar. Thus, similarity allows us to make a comparison of the digital healthcare platforms in the five countries later in the analysis (cf. criteria 1 and 2).

Second, independent research teams scanned the existing digital platforms in each country and selected one for deeper study respecting our criteria 3, 4 and 5 (see Annex 1). Finally, digital health platforms had to agree to provide access to data on the how they create and capture value, which can be sensitive information. Thus, the platform selection was an opportunity- and theory-driven (Ghauri et al., 2020; Patton, 1990).

3.2. Data collection

Data collection was carried out, considering Yin's (2003) chain of evidence logic: 1) we established the research question and objectives (cf. methodology); 2) we have developed a Case study protocol clearly describing the purpose of the protocol, data collection procedures, the outline of the case study report, protocol questions (operationalization of the phenomenon and interview questions); 3) we have developed the Case study database (shared among an international team of researchers in an online repository and complying with the confidentiality requirements), setting the links between the 1) Case study protocol and 2) citations and the source of information (publicly available and archival data, interviews), and conditions under with data was collected (cf. section 3.3). We followed a two-step data collection process in line with the Case study protocol (Yin, 2003; Gnyawali and Park, 2011 ; Stigliani and Ravasi, 2012).

First, we collected secondary data with the aim to explore the context of the digital healthcare platforms (see Tables 1 and 2 and Annex 1). The *secondary data* (publicly available and archival data) included information on digital healthcare platforms and their ecosystems (e.g., a country's health system, national digital regulations, funding and health ICT in the country, platforms, respondents, etc.) and was accessed via

Table 1
Overview of the healthcare systems in the countries analysed.

Case no.	Country	Population[a] (2019, thousands)	Type of the healthcare system in the country	Funding	Healthcare providers	Health expenditure as a share of GDP, 2018 (%)[b]	Life expectancy (years of life at birth, 2018)[c]	Access to care (population eligible for core services (% population, 2019))[d]
1	Finland	5517.9	Mixed	Public insurance, private	Public and private healthcare providers	9.04	81.8	100
2	France	67012.9	Mixed	Public insurance, private	Public and private healthcare providers	11.26	82.8	99.9
3	Lithuania	2794.2	Mixed	Public insurance, private	Public and private healthcare providers	6.57	75.8	98.1
4	Spain	46937.1	Mixed	Public insurance, private	Public and private healthcare providers	8.98	83.5	99.9
5	Sweden	10230.2	Mixed	Public insurance, private	Public and private healthcare providers	10.90	82.6	100

[a] Eurostat Statistics. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Demographic_balance,_2019_(thousands).png.
[b] The World Bank Data. Available at: https://data.worldbank.org/indicator/SH.XPD.CHEX.GD.ZS.
[c] OECD Data. Available at: https://data.oecd.org/healthstat/life-expectancy-at-birth.htm.
[d] OECD Data. Available at: https://www.oecd-ilibrary.org/sites/524da6c0-en/index.html?itemId=/content/component/524da6c0-en.

Table 2
Data sources and usage.

Data source	Type of data	Use in the analysis
Publicly available data (in total 27 press articles; 9 websites, and 7 LinkedIn profiles)	The World Bank website and reposts;	Familiarise with the national healthcare systems, platforms' organisational contexts and interviewees;
	OECD website and reports;	
	OmaOlo: websites of DigiFinland, Hämeenlinna hospital and OmaOlo; 3 press articles; *Hospitalide*: website of Hospitalide; 11 press articles; LinkedIn of the CEO;	Triangulate evidence from the interviews and archival data;
	Emergency telehealth program: websites of the partnering hospitals; 6 press articles; LinkedIn of the respondents;	Clarify and support emerging interpretations about the effect of a social-purpose-driven ecosystem on value capture from digital health platforms.
	La Meva Salut: website; practical experience in using the APP and web in the last 2 years, 5 press articles. *The post-op tablet:* academic articles; 2 press articles.	
Archival data (in total 1 user guide, 1 project description, 1 workshop presentation and 3 webinars)	*OmaOlo:* user guide; 1 webinar of the platform;	Familiarise with the platforms' functionality and organisational contexts;
	Hospitalide: 1 webinar of the platform;	
	Emergency telehealth program: the project description; *La Meva Salut:* 1 workshop presentation; *The post-op tablet:* webinar presentation of the platform.	Triangulate evidence from the interviews and publicly available data.
Interviews (in total 18,25 h of Interviews)	*Pilot interviews* (5) with the product owner, medical professional, nurse, senior manager and CEO to test the protocol and feasibility of the questions. We have performed pilot interviews, one per each case.	Testing the feasibility of the protocol to the interviewees and content validity;
		Gain information about the effect of a social-purpose-driven ecosystem on value capture from digital health platforms; clarify and analyse the content to address the aim of the study;
	Semi-structured interviews (23) with product owners, medical professionals, CEOs, partners of the platforms, senior managers, representatives of the Ministry, ICT experts, innovation managers, project leaders, nurses, and psychologist; 4,6 interviews on average per each case.	
		Triangulate the evidence with publicly available and archival data.

The World Bank, OECD and the platform owners' websites, press releases and platform guidebooks when available; details about the respondents (e.g., their role) were accessed via Linkedin profiles and websites (see Table 2). Relevant information was collected before the interviews with the respondents of the selected digital healthcare platforms.

Second, the semi-structured interviews were carried out to provide a deeper understanding and explanation of the effect of a social-purpose-driven ecosystem on the value capture from digital healthcare platforms. The protocol questions as part of the Case protocol were developed by an international team of researchers in English and later translated into the national language and back. Thus, the interview questions and the procedure were planned in advance. In addition, five pilot interviews (one per country) were performed to test and edit the interview questions to assure clarity and the proper scope of the study. This assured the content validity, and readability of the interviews carried out across five different countries. There were five groups of questions: (1) questions about the country's health ecosystem, the platform and respondent; (2) questions about multilayer and embedded value created; (3) questions about complementary assets of the platform; (4) questions about standardisation and collaborative processes; and (5) questions about socio-economic value capture mechanisms. After each interview, additional questions were asked about the current funding of the digital platform. Interviewees were selected to be able to reflect our interview questions best. Thus, we have interviewed *managers and owners* of the platforms to reflect on strategic decisions and challenges; *medical staff* to reflect on expected clinical outcomes and patient perspective; and *ICT specialists* who knew the technological side of the platform. In addition, platform leaders and medical doctors had double affiliations, reflecting the *perspective of researchers, innovators and product owners* (see Annex 2). Thus, the selected interviewees assured: 1) access to multilayer and multidisciplinary knowledge on the platforms; and 2) motivated answers to all our questions. Interviews were carried out in the national language by the authors from the same country as the platform's origin and then translated into English. Primary data was collected between December 2020 and August 2021. Table 2 summarises the sources of the data and the data usage.

The fact that the data collection was carried out in each case by different researchers reduced the risk of bias in the data collection (e.g. Goffin et al., 2019). Each interview was recorded, transcribed and translated into English what enabled international team of researchers cross analyse the cases.

3.3. Data analysis

The analysis of the cases comprised examination, categorization, tabulating, and general recombining of data to arrive at empirically grounded results (Yin, 2003). We followed several analytical strategies to define what should be analysed and why. Put differently, linking the data to the theoretical propositions and establishing criteria for interpreting the findings. First, we had theoretical propositions deriving from the Profiting from the innovation (PFI) theory (cf. methodology), which served as lenses giving criteria to select relevant information during data collection, but also for purposeful data analysis. Second, we have developed case descriptions, which provided a background for cross-case analysis. (see Annex 1). Also, we have applied several dominant analytical techniques, such as patent matching, explanation building, and cross-case analysis. Below, we describe the application of analytical techniques in more detail.

We have applied (Gioia et al., 2013) methodology to set a data structure (see Fig. 3) and apply patent matching, explanation building, and cross-case analysis analytical techniques. During the analysis of the cases, the coding themes emerge from a cycled process between data and concepts (Gioia et al., 2013; Eisenhardt, 1989; Corbin and Strauss, 1990; Miles and Huberman, 1994). The researchers first skim-read the transcribed interview texts to decide how to analyse the corpus. Next, we

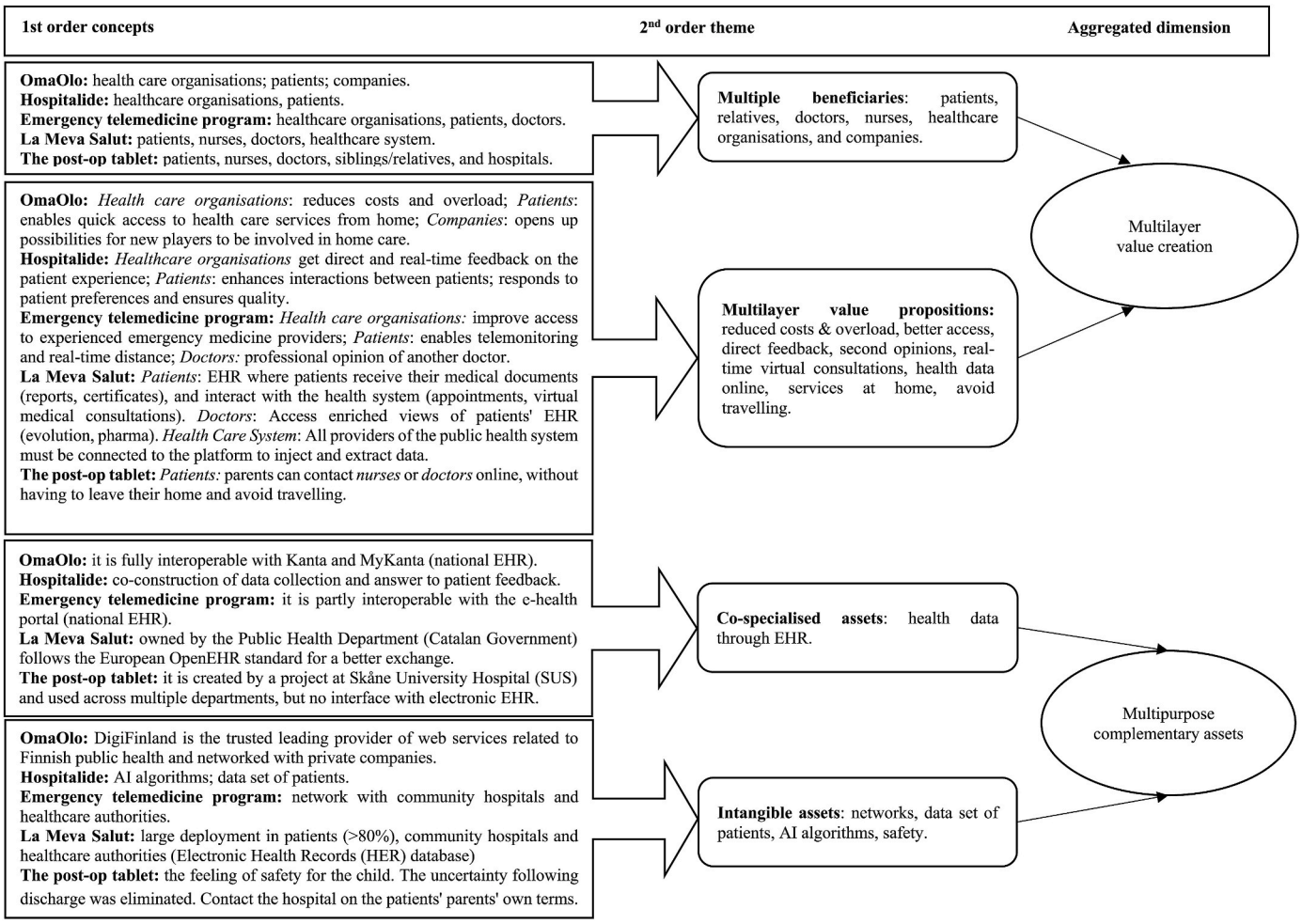

Fig. 3. Data structure of the study.

conducted the coding process of first-order concepts until we reached saturation. Several themes emerged concerning the initial propositions offered by PFI about value capture (Lincoln and Guba, 1990). We then used the pattern-matching constant comparative analysis method: each unit was compared to the previously categorized units so that all could be categorized. In this paper, we created categories of findings using coding, which helped establish a common meaning across the five cases (Gioia et al., 2013). The identified first-order concepts, grouped into second-order themes, are multiple beneficiaries, the value created, co-specialised assets, intangible assets, standardization, vertical integration, complying with a social purpose, and capturing value (see Fig. 3). Finally, 8 s-order themes were aggregated into the four theoretical dimensions based on a PFI framework (e.g., Teece, 1986; 2006; 2018).

Thus Fig. 3 displays the data from each case according to each category. Thus, we can compare the manifestation of PFI tenets in each case and identify similarities and differences. In addition, Fig. 3 shows the logical link between the data to the propositions deriving from the empirical data. Further, the result section explains four emerged propositions with interview quotes as evidence (cf. Section 5).

We have not used software to process data; instead, we had several joint research workshops (one hybrid in Spain and three online) devoted to coding the first-order concepts and aggregating second-order themes and dimensions. Although the software is an effective tool for processing data, thorough discussions carried out by the researchers' teams on the context and semantics of the codes ensured the quality of data coding, aggregation, and interpretation (John and Johnson, 2000). Thus, handling data processing and interpretation through a series of research workshops enabled us to focus on the depth and meaning of data analysis, especially while comparing results across counties.

4. Results

Our study explores the effect of a social-purpose-driven ecosystem on value capture from digital health platforms. We studied five cases of digital healthcare platforms in different European countries: Finland, France, Lithuania, Spain and Sweden. Fig. 3 reflects the data structure and logic of aggregating first-order concepts into second-order themes and theoretical dimensions. Based on the analysis of the results, we came to four aggregated theoretical dimensions that support and extend the PFI framework. We structured the presentation of the study's results in line with the four identified PFI dimensions and supported findings with quotes from the interviewees.

4.1. Multilayer value creation by digital healthcare platforms

The discourse on digital healthcare platform value creation commenced with questioning for whom the value is created. Although the number and nature of the beneficiaries vary depending on the type and scope of the digital health care platform, patients and doctors are prime stakeholders of the platforms. It is well illustrated by the Director of Medicine and Nursing, Emergency telemedicine programme, LSMU Kaunas Clinic: *"I think that the beneficiaries of the platform are obviously doctors and patients, first and foremost. Then I think that the beneficiary is*

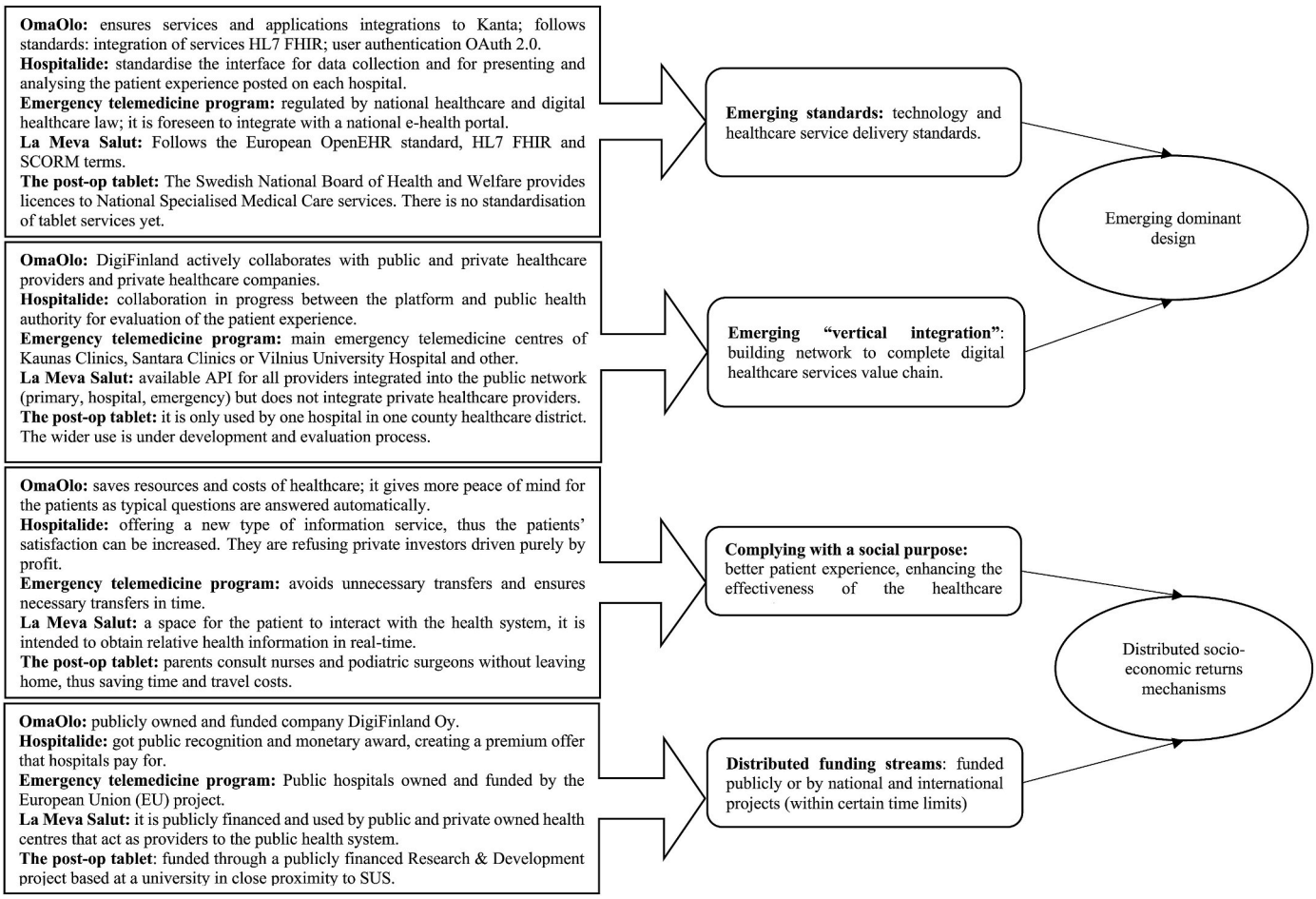

Fig. 3. (*continued*).

also the health insurance funds *because they are the customer of the service in principle. In fact, science could also use that data, and technology developers could also use it because they could analyse that data and think about some start-ups or how to improve the system."* Director, DigiHealth Finland adds: *"Main beneficiaries of the collected data include patients, primary and secondary health care, social care, health care of schools and municipal-level decision-makers."* Some new beneficiaries are mentioned by the Director of the Master of Internet of Things for e-Health, La Meva Salut: *"Beneficiaries are the medical staff, patients, relatives, IT experts (medical staff with high-level profile even statistics). However, perhaps the "main" stakeholders are the medical staff, the patients and their relatives, but there are different roles for them."* The study shows a particular hierarchy among the beneficiaries of digital healthcare platforms. Provided quotes support that patients and doctors are the prime focus of digital healthcare platforms. However, payers are health insurance funds, which are public in most cases and indirect beneficiaries such as families, other medical staff, ICT providers, researchers and others.

Each type of beneficiary is looking for a unique value proposition that would motivate them to adopt digital technologies. Moreover, there is no one solution for all. For example, "*My wife and I were confronted with the Google search. We found that there were lots of forums about maternity hospitals but no decision* support. *The platform's purpose is to collect patient and family feedback about patient experiences posted on the internet. The website allows patients to rate hospitals and clinics following the TripAdvisor model."* States the CEO of the Hospitalide. The Former CEO of the Public Health Department, La Meva Salut, explained: *"Everybody needs to understand and see the added value: the administration itself, the professionals (physicians and nurses), patients, and the industry"*. Furthermore, aside from the direct developers and users of the post-op tablet, the parents of the children operated upon and the treating doctors and nurses, a further indirect but great beneficiary was discovered – the siblings of the children operated upon. As the project leader of the post-op tablet stated, "*As the children put it, when they know that the sibling is going to the hospital, they never know if the siblings or the parents will come home, because the sibling may become ill and they may stay in the hospital, and so they stayed for 14 days. With the help of the new tablet, they [the parents and the child operated] do not have to go in, and then the children said that it was such security when the siblings received treatment at home because then they knew they were home when the sibling came home from school."* The post-op tablet also allows less specialised doctors at smaller hospitals to connect with doctors from university hospitals, providing learning opportunities. The family sometimes brings the post-op tablet to doctors' appointments at home hospitals. *"They (the patient's parents) bring their post-op tablet (to the appointment at the local hospital), and they then connect with us through the tablet, and we can look at the patient together"*. As part of the impact of a social-purpose-driven ecosystem, digital healthcare platforms support knowledge-sharing and learning opportunities across distant geographies. A Senior Specialist for eHealth systems and information resources at the Ministry of Health of The Republic of Lithuania echoes the post-op tablet project leader: *"It is expected that this platform will help to reduce unnecessary referrals of the patients to major centres, and then the time saved could be devoted to the care of other patients and also improve the quality of services provided to patients themselves, since consulting specialists in distant centres could provide services to the population without transporting them, and it is likely that the patient's health option could improve since the care itself would be of higher quality and efficiency."*

In addition, Hospitalide creates value for the patient who has more information about hospitals and care services and can choose according

to this additional information. Additionally, value creation is oriented to hospitals to, for instance, control the e-reputation: *"The hospital will gain an improved reputation, it will take control of the opinions [we have private sections of the platform for a hospital to track, analyse, and answer timely to patient feedback]"* explains the CEO of Hospitalidee. A family doctor, the intensive user of LMS at La Meva Salut, notes that the platform helps to manage a doctor's workload, which is an essential issue in many cases: "*It [the platform] allows health workers the possibility of organising their agenda and having more time for face-to-face medical consultations."*

Finally, probably the most critical value created by the Post-op tablet is security, shared by healthcare staff and the parents of the children who have been operated on. One of the nurses using the tablet for treatment underscores this: "*It gives security, and the parents can feel secure at home. They can contact us whenever and know exactly who they are writing to."* Both are reading the queries and looking at photos, increasing the security of the nurses when making decisions and offering advice.

Due to the photo function combined with the easy access and ongoing communication, the nurse states that they also *"catch infections at a very early stage, even before the parents have noticed anything … and we can start treatment earlier."* This has positive medical benefits for the child, the parents do not need to come to the hospital, and all save money.

4.2. Multipurpose complementary assets of the digital healthcare platforms

The phenomenon of complementary assets was first acknowledged by Teece (2014) as assets that co-create superior value in combination. It is perceived that complementary assets can serve as "the second form of isolating mechanism that affects the risk of being imitated" (Rumelt, 1984 p.557). In order to capture value, digital healthcare platforms also require complementary assets, especially as health data is regarded as a co-specialised asset by its nature (e.g., Teece, 2018; Pundziene et al., 2022). Co-specialised assets are factors which cannot create value in the absence of any other (e.g., Teece, 1986). For example, complementary assets can include networks, capabilities and know-how, health data, technology and equipment, sale and service infrastructure, etc. (Hallberg and Brattström, 2019). As Hallberg and Brattström (2019, p.170) posit, "These complementary assets can be accessed by the innovating firm through market contracting, collaborations/joint ventures, and acquisitions/integration."

Senior Specialist for eHealth systems and information resources at the Ministry of Health of The Republic of Lithuania explains that: *"The healthcare system in Lithuania is organised in a way that healthcare providers use their information systems and then provide data to national eHealth system – national electronic health records (EHR)". All patients, doctors and relevant healthcare providers can access their own health data."* Grupo Pulso, e-health solutions at La Meva Salut continues: "*To connect data from third parties is an important feature and growing benefit to be developed. When the new M-connecta platform under development will be finished, it will be possible to push information from outside the platform (i.e. app, wearables, etc.). Currently, it just shows the information available in public health institutions' records"*. Our study shows that health data is a major co-specialised asset of digital healthcare platforms as to possess *complete* health data requires access and integration of health data from multiple stakeholders of the platform. Besides, the secondary use of health data is an opportunity for researchers and new businesses. As a family doctor and intensive user of LMS at La Meva Salut says: *"I never asked for access to the data for research topics, but it would be one of the possible applications."*

Furthermore, most digital intellectual property is not patented, especially in Europe and thus has a weak appropriability regime. As a result, complementary assets are essential for digital health platforms to compete successfully and reap significant benefits (Hallberg and Brattström, 2019). Most of our analysed platforms pose complementary assets, e.g., digital technologies, know-how, networks, and access via partners or platform stakeholders. For example, Hospitalidee has (1) a unique database of patient profiles that it can model if needed, (2) specific AI algorithms such as one to allow to control the patient feedback (spot fake comments) and (3) a value of protecting doctors against defamation and thus processes to moderate and certified patient feedback *"We moderate everything that is individual concerning judgments of people or judgments of competence. For example, the nurse did not talk to me well, that is fine. On the other hand, a nurse who did not talk to me well is moderate"* (CEO, Hospitalidee). The former CEO of the Public Health Department, La Meva Salut explains: *"Intangible things are more important: for example, there is the capacity to use the platform for health prevention"*. Director of the Master of Internet of Things for e-Health-Universitat Auònoma de Barcelona, La Meva Salut explain: *"The platform itself is an intangible asset, where the whole data storage is held."* In the case of the post-op tablet, the primary value is the intangible asset of security – security for the parents in being able to immediately and directly contact the healthcare staff they know, security for the healthcare staff in being able to obtain photos and two-way contact (secure video-conferencing) with the parents, and security for the siblings of not seeing their parents and ill brother or sister leave for the hospital for a potentially unknown period of time. As the project leader of the post-op tablet says: *"The tablet offers a safer means of meeting and treating patients."*

4.3. Emerging dominant design of the digital healthcare platforms

Our study indicates that digital healthcare platforms run on several standards that relate to different competence areas of the platform. First, we have to take into account the standards that are associated with digital technologies, e.g., as OmaOlo explains: "*The company is responsible for ensuring service and applications integrations to Kanta. The HL7 FHIR standard plays a key role in integrating services. For user authentication, OAuth 2.0 is a key standard."* The former CEO of the Public Health Department at La Meva Salut continues: "*La Meva Salut follows the European OpenEHR standard, HL7 FHIR and SCORM terms."* The second type of standard relates to digital healthcare service and delivery standards. In the case of its Emergency telemedicine programme, LSMU Kaunas Clinic, Lithuania, says: *"Healthcare services are regulated by several leading national healthcare and digital healthcare regulations. It is foreseen to combine the services and capabilities of the national eHealth system, main emergency telemedicine centres of Kaunas Clinics, Santara Clinics or Vilnius University Hospital and other hospitals."* CEO TIC Salut in Social Foundation, La Meva Salut explain: *"The information in the medical history is standardised, however from other public or private providers, it is not standardised."* Furthermore, it is important to standardise health records across European countries *"in order to have a European portal, the different countries must decide to homogenise the data models where the clinical information is located. If the purpose is a single medical record, as long as countries do not share data models, reaching this objective will be very complex. In order to have good integration between systems, semantic interoperability is needed"* - (Platform IT Manager of the Health Department at the Generalitat de Catalunya -Catalan Government, La Meva Salut). In the case of the post-op tablet, the Swedish National Board of Health and Welfare provides licences to National Specialised Medical Care services. The development of the tablet is funded entirely by national public/state research funds. Currently, it is used by only one hospital in one county healthcare district. Tablet services are not yet standardised. The broader use of the tablet is undergoing development and evaluation.

Finally, Hospitalidee offers a standardised interface for collecting patient experience (same way of registering and rating hospitals and filling in comments) and a standardised format for presenting and analysing the patient experience posted on each hospital. The CEO of Hospitalidee says about the possibilities of standardisation of analysing the hospitals feedback: "*If we have all the traffic, we can propose analyses."*

Initially, the public health authority did not collaborate with Hospitalidee as they were concerned about potentially competing with Hospitalidee in data collection. Now, however, they co-develop webinars promoting digital patient feedback and are creating a process for Hospitalidee to help fill in a national digital survey on patient experience: *"They send me the patients [and in addition] I will recover PREMs and PROMs [for them] thanks to the patients that I have been able to acquire and that the hospitals had miss out."*

The emergency telemedicine program services are described as: *"Doctor working at the telemedicine centre at the university will then communicate with both the patient and the doctor at the district, district hospital and will be able to interview the patient, will be able to examine the patient through a high-quality image, will be able to review the tests he has already carried out, medical devices may be connected there, and he can carry out and evaluate additional tests himself at a distance, and then the communications consultant will advise either to continue the treatment of that patient in the district or to transport them to a university hospital, or he will decide that it is possible to spend the house."* This is similar to La Meva Salut platform services: *"Users access* via *web or* via *app, the medical staff accesses* via *a local application. Research community accesses directly to datasets through pre-established forms."*

Security and privacy regulations [in Sweden] precluded the option of developing a functionality whereby photographs could be sent by private to the treating healthcare staff out of fear that photos taken on phones would be stored on phones or cloud services. This required developing the system on a closed, direct-channel tablet. As the pediatric doctor using the tablet says: *"After all these meetings, [with regulatory officials], we reached the conclusion that we cannot do pictures and film* via *an app, we can do all other things [written communication] … but we want a photo, and we cannot get a photo … because we could not do anything with enough security. A secure solution that lived up to [the regulator's] requirements for security."*

4.4. Distributed socio-economic returns mechanisms of digital healthcare platforms

In contrast to PFI's prior research, digital healthcare platforms embedded within the social-purpose-driven ecosystem, be they the public or private sector, prioritise the platform's social impact and benefits for patients. A medical doctor, in the city of Hämeenlinna, on OmaOlo states: *"Lifestyle-related chronic diseases are a major public health risk. OmaOlo enables patients to do lifestyle assessments at their own* pace *and get personalised guidance. OmoOla is a vital tool for preventative health care."* The Director of Medicine and Nursing at the Emergency telemedicine program continues: *"Social returns and economic returns. Now I have to open up my description of this project. We know how we have calculated, we have calculated that about 13 percent of unnecessary transportation is from the districts to our medical institution and from our institution to the district, and we have calculated the costs and time costs of those transportations. And in Lithuania, it is challenging to calculate the benefits patients are experiencing. Because time spent unnecessarily contains a certain cost of health deterioration, it is complicated to calculate how much it will improve or worsen. However, purely from economic things, I have to open up now because I have been looking at that project as it was written for a long time, so now I am not going to say it any time soon."* The post-op tablet has been developed in a social-purpose, non-commercial context. Its development was funded by a public/state research and innovation fund to improve healthcare system efficiencies. Despite the multiple benefits generated by the post-op tablet, its non-commercial origins mean that when the project period is over it is unclear who will take over its operation, further development and maintenance. The project leader of the post-op tablet states: *"At the moment, I own responsibility for all this [as project leader] everything that is on the tablets, all the service, all the insurance, and it all has been developed on a project* grant. *But the day it is to be turned over to the clinics, and we say now you the users have to take all the responsibility, to implement and maintain them [the tablets], we do not know how that will go."* So, while the demand side is secure and can expand, it is unclear who will assume the supply side.

Thus, the social benefits of digital healthcare platforms go first. Although the ultimate goal of the platforms is patient clinical outcome and safety, the effectiveness of the healthcare system: *"The use of the platform is a more efficient way of assigning the public budget. Future developments will allow increased efficiency"* (Director of the Master of Internet of Things for e-Health- Universitat Autònoma de Barcelona, La Meva Salut), however, there is a need for value capture model to cover operational costs of digital technology adoption and platform maintenance. This is a challenging issue without a clear solution so far. Hospitalidee, at its creation phase, was capturing value by participating in innovation contests and won several ones that unlocked or got money awards; but in the scaling phase, it had to be founded on private funding: *"I won many prizes and therefore scholarships and credits, I have money easily at the very start […] then it is to say that there were many crossings of the desert, there was a lot of very tough time. I sold everything at home, house, car, everything, to pursue my project and ensure [hospitalidee] survival"* During a non-recorded meeting, Hospitalidee explained refusing external funding because the business angel was not considering the specificity of health and wanted only to make a profit even if it was going to hurt doctors. It is why finding a business model generating revenue such as creating a premium offer that the hospital pays for, was vital for Hospitalidee. This freemium model appears on hospitalidee PowerPoint distributed to hospitals.

Public digital healthcare platforms like the Emergency telemedicine program, the post-op tablet or La Meva Salut started as nationally or international funded projects and are looking for support from the national health insurance fund: *"I imagine that this should be covered by the compulsory healthcare insurance budget anyway"* (Director for Public Health, Research and Education at Emergency telemedicine program). Cost savings for the national healthcare system comes as an argument in favour of many platforms. The post-op tablet allows the healthcare system to save money on in-patient care, as parents of medically stable patients who otherwise would stay longer in the hospital due to insecurity of the parents about assessing the condition of their child from home. In these cases, as the PI of the project states, *"these children can in some cases go home earlier (with the post-op-tablet) because they have this bridge, this direct line to us, with them. We can offer much stronger* support *with the post-op- tablet"*. The Director DigiHealth Finland, OmaOlo continues: *"When patients do not always need to visit a doctor but can-do symptom assessment with OmaOlo from their home sofa and get guidance, municipalities and state* save *money and resources"*. A medical doctor, in the city of Hämeenlinna, OmaOlo echoes: *"When COVID-19 symptom assessment and time reservation was done automatically using OmaOlo, an average of 10 min of nurse's time was saved. With the massive number of assessments, time savings were really significant."*

Based on the provided analysis of the results, we have distilled four PFI dimensions that are specific to digital healthcare platforms operating in a social-purpose-driven ecosystem: (1) multilayer value creation, (2) multipurpose complementary assets, (3) emerging dominant design and (4) distributed socio-economic returns mechanisms. Fig. 3 provides a full set of first-order concepts, second-order themes and aggregated dimensions that constitute our data structure.

5. Discussion and implications

Our study aimed to answer the following research question: "What is the effect of a social-purpose-driven ecosystem on value capture from digital health platforms". By analysing five European digital healthcare platforms, we have explored value capture from digital healthcare platforms that are embedded into the social-purpose-driven ecosystem and, thus, prioritise social impact ahead of profit. Previous research has focused mainly on digital platforms in diverse business sectors that are not social-purpose sensitive, such as manufacturing, automotive and social media (Hagiu and Wright, 2015; Anderson et al., 2014; Gawer,

2014; Cennamo et al., 2018; Cusumano et al., 2019). Several studies that explored the digital transformation of the healthcare sector in more general terms (Fournier et al., 2020; Bates, 2010; Drago et al., 2021; Azzopardi-Muscat and Sørensen, 2019) and different types of digital healthcare platforms and their ecosystems (Ruokolainen et al., 2022; Biancone et al., 2021; Pundziene et al., 2022; Sermontyte-Baniule et al., 2022). However, reviewed studies did not cover the effect of a social-purpose-driven ecosystem on value capture from digital health platforms.

Thus, our theoretical and empirical research findings spotlight four dimensions vital to capture value from digital healthcare platforms: 1) multilayer value creation, which is related to individual well-being or healthcare system-wide benefits; 2) multipurpose complementary assets, which assure completeness of health data, but also co-sharing of needed resources to assure the competitiveness of the platform under the weak appropriation regime; 3) emerging dominant design or rather lack of it so far. Emerging digital healthcare platforms are scattered across the value chain focusing on upstream or downstream services and are embedded in local healthcare systems, making it difficult to unify technological but also digital healthcare service and its delivery-related standards; 4) distributed socio-economic returns mechanisms that should help to capture value from digital healthcare platforms are still emerging. There are clearly defined social benefits; however, economic returns mechanisms still stumble to secure the sustainable development of digital healthcare platforms, especially scaling.

5.1. Propositions and future research directions

Summing up our conceptual and empirical research, we provide the following propositions to highlight our findings and future research avenues.

Porter (2010, p.2477) indicates that “achieving high value for patients must become the overarching goal of healthcare delivery, with value defined as the health outcomes achieved per dollar spent”. Furthermore, White (2018, p.2) notes that “the value proposition as it may exist in healthcare is likely very complex and may be subject to significant potential covariates as well as errors in its most fundamental assumptions.” Our study confirms that: 1) patients’ well-being is regarded as the first priority for all groups of stakeholders of the digital healthcare platforms; this virtue creates a social-purpose-driven context for digital healthcare platforms’ performance; 2) the value proposition of the digital healthcare platforms is complex and multilayer. In contrast to the prior research, our findings posit a complex hierarchy of beneficiaries of digital healthcare platforms, which serves different purposes in value creation and capture. Patients are the highest priority and end users of the digital healthcare platforms. However, to capture value from digital healthcare platforms, healthcare insurance funds (typically public in Europe) and employers are significant stakeholders of the platforms, capable of securing the platforms’ sustainable development, maintenance and scaling. Thus, digital healthcare platforms need to offer tailored value propositions to key groups of platform beneficiaries and stakeholders at the same time. Our study shows that besides patient well-being, cost reduction and enhanced efficiency of the healthcare system is a major expected value to healthcare insurance funds (the major payers of digital healthcare services in Europe); workload reduction and productive time optimisation is a significant value to medical doctors and public healthcare providers. Thus, our first proposition is as follows.

Proposition 1. Multilayer value creation in line with the hierarchy of the beneficiaries and shareholders enables socio-economic returns from digital healthcare platforms.

Teece (2018) acknowledged that complementary assets are significant in evaluating the success of digital transformation and the competitiveness of digital platforms and ecosystems. Complementary assets serve multiple purposes in digital healthcare platforms. First, it can be regarded as an isolation mechanism to protect intellectual property under the weak appropriation regime when innovations are not patentable (e.g. Gambardella et al., 2021). Second, to provide access to idiosyncratic resources, such as complementary technologies, know-how and health data (e.g. Ruokolainen et al., 2022). Third, when digital healthcare services are modularised, platform owners can develop niche complements and offer them to other platforms as an additional income source. Furthermore, complementary assets can help platform providers to obtain vital resources and to manage risks, costs and competition. Finally, they can be helpful when negotiating mergers and acquisitions, complying with federal and State regulations (i.e., for legal or tax purposes), and for financial reporting and strategic planning (leasing, financing and joint ventures). Newsad et al. (2014) listed common intangible assets in digital healthcare as electronic health records (EHRs), certificates of need, state licensure, Medicare certification, patents, and workforce. Our case study supports that complements serve multiple purposes to digital healthcare platforms. In contrast to prior studies, our study shows that complementary assets, such as ability to access public funding and network with policy makers and knowledge institutions (e.g. Universities) (e.g. OmaOlo, Emergency telemedicine program, La Meva Salut, the post-op tablet) helps to capture value from digital healthcare platforms at early stages of their development. Thus, our second proposition is as follows.

Proposition 2. Multipurpose complementary assets are vital to enable socio-economic return from digital healthcare platforms.

Teece (2014) identified dominant design as an important factor for profiting from innovation. As a result of market competition, the dominant player can impose standards on the rest of the competitors and new entrants (Teece, 2018). On the other hand, some more complex standards, e.g. wireless telecom and the internet of things, are developed collectively together with some standards-setting bodies, such as IEEE. "De facto standards will continue to play a vital role in the digital economy” (Teece, 2018, p.1380). Our study supports that digital healthcare platforms do comply with digital technology standards, such as the HL7 FHIR standard for integration of services; OAuth 2.0 is a key standard for user authentication and openEHR (e.g., OmaOlo and La Meva Salut), however, the findings of the study also indicate that there is a lack of system-wide integration and deployment of standards, e.g. at present platforms operate on a local level and are not fully integrated, especially there is lack of interoperability between the private and public owned digital healthcare platforms and their integration with national EHR. Bates’s (2010) echoes that a significant factor contributing to the less-than-optimal EHRs performance is a lack of support for integrated healthcare services. Most cases report that platforms’ stakeholders are developing networks that allow or will allow closer cooperation and better interoperability among different parts of the platforms and, furthermore, national EHR. Coordination of the upstream and downstream players, along with the multiple digital healthcare markets, is essential for dominant design to emerge (e.g. Bresnahan and Trajtenberg, 1995; Gambardella et al., 2021). However, Hospitalidee and Emergency telemedicine program cases show that establishing collaborative networks between private and public, but also between public and public healthcare providers and platform owners, is not easy at all. The absence of "vertical integration" is a significant obstacle to the digital healthcare platforms to capture value at the right time to ensure the sustainable scaling of the platforms, especially in social-purpose-driven ecosystem.

Without standards and a dominant design, it is difficult to: 1) achieve needed interoperability at the level of technology, but also digital healthcare services development and their delivery; 2) assure modularisation of digital healthcare services, which allows platform owners to specialise within the ecosystem and develop complements; 3) to assure competitive advantage of the platform and multiple funding sources in a complex and maturing digital healthcare platform market.

Our study shows, that standards and dominant design of digital

healthcare platforms is emerging at present, but not fully there. Thus, platform owners stumble with fragmented returns on socio-economic value created.

Thus, our third proposition is as follows.

Proposition 3. Emerging dominant design through vertical integration of digital healthcare platform beneficiaries and stakeholders can enable socio-economic returns from platforms.

Analysed case studies provided evidence of social value generated by the platforms, such as increased patient satisfaction and saved time due to online consultations, but also identified better quality of care and improved health outcomes. For example, the analysis of the emergency telemedicine programme found that patients were often assessed by two doctors, one in the emergency department of the district or regional hospital and the other remotely in an emergency telemedicine centre. We also confirmed that digital healthcare platforms saved resources and other related costs of healthcare services (cost-effectiveness). This is in line with Visconti and Morea (2020) research reporting that the socio-economic impact of digital platforms can foster the overall sustainability of the healthcare ecosystem. Their results showed that essential savings could be achieved through digitalisation, supporting the research question of estimating the impact of digital solutions that lessen supply chain bottlenecks. Also, digitalisation can generate extra benefits that produce incremental economic and financial margins. Jennett et al. (2003) further identified the main social benefits: increased access to health services, cost-effectiveness, enhanced educational opportunities, improved health outcomes, a better quality of care, better quality of life and enhanced social support.

We went further than confirming prior research outcomes by identifying the key role of distributed socio-economic returns mechanisms. Indeed, healthcare organisations hold back in the diffusion of privately-owned platforms. For example, the CEO of Hospitalidee, an outsider to the healthcare industry, had to fund the platform on its own resources until he successfully engaged healthcare providers to pay for patient feedback. This empirical fact questions the role of the origins of innovation that maximises healthcare service quality. On the one hand, the healthcare system (when the public healthcare system is dominating, e.g. European countries), in the first instance, rejects privately founded digital healthcare platforms, on the other hand, it lacks resources and capabilities to successfully create and maintain platforms owned by the healthcare providers or the State. More importantly, our study confirms and spotlights the need for these platforms to have a business model assuring sustainable income survival. Gawer (2022) states that platform owners can capture a significant part of the created value through the distributed network, monitored and controlled resources without owning them. Big Tech companies can serve as an example when they succeed in concentrating value capture based on distributed value creation, pervasive networks and connectivity and business model innovation (Gawer, 2022). Our study reports that four of five platforms were funded either by national or international competitive funding with no continued funding or by the State. To ensure sustainable, continuous funding of the digital healthcare platforms owned by healthcare providers or the State, distributed funding mechanisms are needed. We call distributed funding when several diverse sources of funding are used at the same time. One of the possible solutions is multiple or distributed funding streams, without which these platforms would not survive. Thus, our fourth proposition is as follows.

Proposition 4. Distributed funding streams, including public and private sources, are significant in enabling socio-economic returns from digital healthcare platforms. Complying with a social-purpose-driven value proposition can better assure multiple funding streams, especially public ones.

Digital platforms have unique features and capabilities to create and capture value in the digital economy (Gawer, 2022). However, our research illustrated that to make full use of the new opportunities created by digital healthcare platforms, some conditions should be met: 1) platforms need to create multilayer value for multiple groups of beneficiaries that have their own hierarchy – patients as a priority, doctors, payers, complementors; 2) digital healthcare platforms can utilise multipurpose complementary assets to sustain competitive advantage; however, more importantly, to build idiosyncratic networks, build complete sets of health data, share costs of the resource ownership and isolate value from the competitors; 3) support of the emergence of the dominant design of the digital platform services through the standardisation of the digital technologies and services; vertical integration of the health ecosystem stakeholders that possess different elements of complementary assets extending beyond the public sector. Finally, 4) assure distributed socio-economic returns mechanisms to leverage public and private funding. Fig. 4 illustrates the role of four unique components: multilayer value creation, multipurpose complementary assets, emerging dominant design and distributed socio-economic returns mechanisms in enacting value capture from digital healthcare platforms embedded within the social-purpose-driven ecosystem.

5.2. Theoretical implications

While the number of publications on digital healthcare platforms is growing, little has been said about how the embeddedness of a digital healthcare platform in a social-purpose-driven ecosystem affects its value capture. The contextual effect of the ecosystem and the business model concept was acknowledged as an integral part of the Profiting from Innovations (PFI) framework, which can explicate the success of digital platforms (e.g. Teece 2018; Helfat and Raubitschek, 2018). Thus, in this paper, we applied the PFI framework and extended it by explaining the value captured from digital healthcare platforms embedded in a social-purpose-driven ecosystem. Our study makes a threefold contribution to the prior PFI and platforms literature. First, we propose four unique PFI components that are significant while capturing value from digital healthcare platforms: 1) multilayer value creation, 2) multipurpose complementary assets, 3) emerging dominant design, and 4) distributed socio-economic returns mechanisms. Second, we empirically explore the significance of the embeddedness feature of digital healthcare platforms and the contextual effect of the ecosystem. Third,

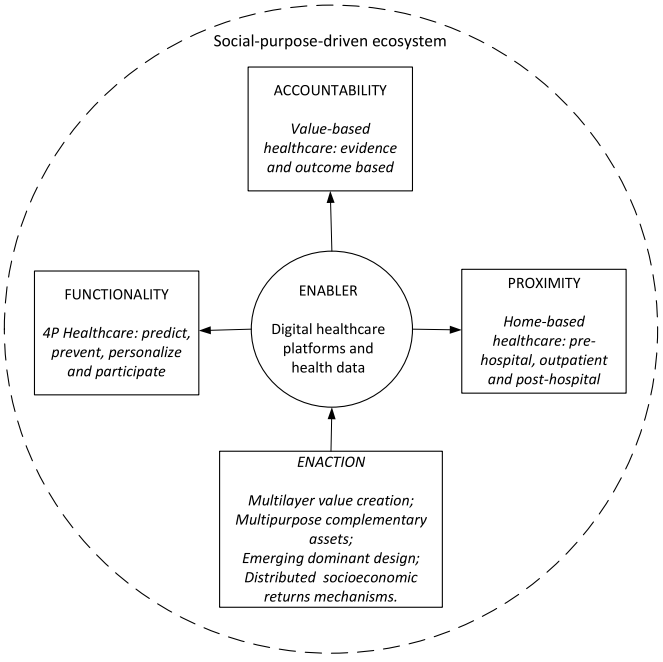

Fig. 4. *Enacting capturing value from digital healthcare platforms embedded in a social-purpose-driven ecosystem.*

we propose a concept of a social-purpose-driven ecosystem, which well explains the behaviour of the business sectors that put social impact before the profits, such as healthcare, education, and government.

5.3. Policy and managerial implications

The results of this study may have several consequences for platform owners and policymakers. The multiple case study demonstrates that although each country has established public and private funding schemes, still continuity and scaling of a digital healthcare platform can depend on distributed funding sources. Distributed funding means using several funding sources together to fund digital healthcare platform services instead of just one primary source. For example, EU or nationally-funded research and innovation projects face the challenge of maintaining a newly created digital healthcare platform when the project funding ends. At this stage, private funding, e.g. business angels or venture capital, is still a too-early option. Thus, public or public-private funding needs to be raised. Thus, we call on platform owners and policymakers to acknowledge the contextual effect of a social-purpose-driven ecosystem when "social-purpose" makes the platform's scaling process longer than regular start-up; less attractive to private investors due to the time factor but also due to the lower margins and heavily regulated environment; it entails high risks related with the safe management of health data and high complexity and diversity of the healthcare ecosystem. Furthermore, we offer four unique contingencies which are essential conditions for value capture from digital healthcare platforms: 1) multilayer value creation; 2) multipurpose complementary assets; 3) emerging dominant design, and 4) distributed socio-economic returns mechanisms. To capture value from digital healthcare platforms, platform owners need to tailor value propositions to patients and doctors, but also to public payers, such as public health insurance funds. Furthermore, complementary assets are vital to isolate digital platforms' intellectual property from easy imitation. On the other hand, leverage idiosyncratic resources, e.g. health data, needed to continue to develop and scale. It is important to support emerging standards, and consolidation of the stakeholders (vertical integration via networks' development) assures completeness of the digital healthcare platform's services value chain and, thus, enhance the effectiveness of the platform performance. This is possible due to eliminating duplications of efforts while building new alternative platforms. Dominant design can be seen as a threat as well. The existence of the dominant design can be in favour of mature and big platforms and burden new entrants. Finally, platform owners and policymakers need to master distributed socio-economic returns mechanisms – to ensure several diverse funding sources at the time to cover social returns and periods between the projects.

6. Conclusions and limitations

With this paper, we aimed to explore what is the effect of a social-purpose-driven ecosystem on value capture from digital health platforms. We have deployed multiple case study research design to investigate digital healthcare platforms in five countries (Finland, France, Lithuania, Spain and Sweden). The multiple case study approach allowed us to compare different digital healthcare platforms and highlight their similarities and differences. As a result, we have identified four unique components of the PFI framework that enact capturing value from digital healthcare platforms which are embedded in a social-purpose-driven ecosystem: 1) multilayer value creation; 2) multipurpose complementary assets, 3) emerging dominant design; and 4) distributed socio-economic returns mechanism. The paper offers a threefold contribution to the scholarly discussion by proposing four unique contingencies, empirically testing the contextual role of embeddedness into the ecosystem, and proposing a concept of a social-purpose-driven ecosystem to spotlight the different nature of healthcare which puts social impact before profits. Practical implications of the study call for platform owners and policymakers to consider the four identified contingencies in order to enact value capture from digital healthcare platforms.

This paper has some limitations that do not diminish the study's strengths. We identify three limitations which also can be seen as future research opportunities: 1) the study examined platforms that are new entrants owned by the public entities in the majority, thus the question of how Big Tech or MedTech – incumbent born – platforms capture value from digital healthcare platforms embedded in social-purpose-driven ecosystem still remains open; 2) to allow the comparison, we examine platforms operating in five European countries with the similar healthcare system. However, we do not analyse the US or other private healthcare ecosystems, which might bring new insights; 3) we have not focused on any specific clinical area of the digital healthcare platforms. Thus, future research can elaborate on value capture from digital healthcare platforms in a specific clinical area.

These three research opportunities start an emerging sub-stream of research on profit from innovation in the social-purpose ecosystem.

Data availability

The authors are unable or have chosen not to specify which data has been used.

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Annexes.

Annex 1
Descriptions of the cases analysed.

Case no.	Case name	Short description of the platform	Country of application	Date of creation	Platform owner	External recognition of the platform
1	OmaOlo	Omaolo.fi service provides a home-centred solution for symptom assessment and for accessing support. Health and wellness checks can be done as a self-service, and the solution advises patients when they should search for professional help and guides the citizens to reserve appointment times from physical or virtual clinics. Service can also be used for creating, storing and following up self-care programs and plans for citizens. Linkage to health and wellness coaching is also under development.	Finland	2014	Public institution	Not found

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Annex 1 (*continued*)

Case no.	Case name	Short description of the platform	Country of application	Date of creation	Platform owner	External recognition of the platform
2	Hospitalide	This platform allows patients to grade and share their experience about any care service. Some media call it 'the TripAdvisor' of health organization. It has two ambitions: first to contribute to information transparency between patients and health organisations; and second, to push health providers to consider not only the quality of care and outcomes, but also the quality of the patient care journey.	France	2015	Start-up	Wan several innovation prizes such as « Hôpital de demain" and « prix "e-santé" »
3	Emergency telehealth program	An upcoming project for telemedicine in an emergency setting in Lithuania is a pilot project for the provision of emergency telemedicine services, funded by the European Union. It was launched in 12 medical institutions in order to increase the availability of emergency medical services. The main aim of this project is to develop and test a model for the provision of emergency telemedicine services, which, if successful, will be developed in other hospitals in Lithuania. This project combines the services and capabilities of the national e-health portal, main emergency telemedicine centres of Kaunas Clinics, Santara Clinics or Vilnius University Hospital and other hospitals.	Lithuania	2020	Project-based initiative of the Hospital	Funded by European Union R&I project
4	La Meva Salut	La Meva Salut platform allows consulting and downloading clinical reports, diagnoses, certificates and the results of clinical analyses and tests. It also allows accessing the current medication plan to go directly to the pharmacy, request for a primary care visit and access to various digital health services. The platform incorporates an online consultation service, so-called e-Consultation, for making health inquiries to professionals, carrying out procedures and sending documents. Therefore, it is a space where patients not only passively receive their medical documents but can also interact with the health system to make an appointment. However, most of the functionalities are still aimed at consulting information.	Spain	2015	The Health Department of the Catalan Government	Not found
5	The post-op tablet	The tablet directly connects the parents of paediatric surgery patients who have been operated on for a select number of uncommon diagnoses. These patients may reside at a great distance from the treating hospital. Through the tablet the patient's parents can send emails, photos, video conference and chat with the treatment healthcare professionals in a secure manner without having to leave their home and avoid travelling. The level of communication security and direct channel is significant as the correspondence and especially photos are usually of a highly intimate and sensitive nature.	Sweden	2018	Project-based organization	Externally funded R&I project

Annex 2
Information on the interviews and interviewees

Case no.	Case name	Country of the case	Interview no.	Duration of the interview	Information about the interviewees
1	OmaOlo	Finland	1	30 min	Product owner from the publicly owned company developing service
			2	45 min	Product owner from the company, focus on User Experience
			3	30 min	Medical professional from city health organization involved in the development and usage of the service
2	Hospitalide	France	4	60 min	CEO
			5	40 min	Employee
			6	72 min	Partner - Doctor
			7	45 min	Current Partner – Association for medical professional
			8	41 min	Potential Partner – Association for non-drug interventions
3	Emergency telehealth program	Lithuania	9	46 min	Director of Medicine and Nursing
			10	42 min	Director for Public Health, Research and Education
			11	38 min	Representative of Ministry of Health of The Republic of Lithuania - Responsible for emergency health
			12	42 min	Emergency medicine physician
			13	45 min	Senior specialist for eHealth systems and information resources at Ministry of Health of The Republic of Lithuania
4	La Meva Salut	Spain	14	60 min	Director of the Master of Internet of Things for e-Health. UAB Professor. University
			15	45 min	CEO TIC Salut Social Foundation. IT provider. Public Company (Catalonia)
			16	45 min	Family doctor. Clinician user of the platform. Public Healh Service (Catalonia)

(*continued on next page*)

Annex 2 (*continued*)

Case no.	Case name	Country of the case	Interview no.	Duration of the interview	Information about the interviewees
			17	45 min	Innovation Manager. Content & App provider. Pulso (Evidence group) Private company
			18	40 min	Former CEO of the Public Health Department. EIT Health Expert. Catalan Government
			19	47 min	Platform IT Manager of the Health Department at the Generalitat de Catalunya.
5	The post-op tablet	Sweden	20	68 min	Project leader
			21	56 min	Paediatric nurse
			22	43 min	Psychologist, project evaluator
			23	70 min	Medical doctor – paediatric surgeon

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