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Common good in the era of data-intensive healthcare

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In recent years, scholars studying data-intensive healthcare have argued that data-driven technologies bind together new actors and goals as part of healthcare. By combining the expectation studies with justification theory, this article adopts a novel theoretical perspective to understand how these actors and goals are enroled in healthcare. Drawing on a case study of Apotti, a Finnish social services and healthcare information system renewal project, the article shows how new emerging health data assemblages stress the aims of producing the common good in public healthcare. The project is studied by analysing interviews of the project's key actors and various documents produced in the project. The paper shows how, in the collective expectations, the new information system is justified by multiple understandings of the common good, which might be contradictory with each other. Along with the established goals of improving public healthcare operations, the new information system is expected to empower clients and patients, audit and manage personnel, promote national digital social and healthcare service markets, provide better data and tools for research, and promote Finnish research and business in international competition. These expectations are not all based on the settled understanding of the common good of public healthcare as promoting health; the common good is also defined in other terms such as improving research, promoting markets and business, and making Finland famous and a leading country in the digital social services and healthcare field. These goals and expectations are purposely ambiguous to be loose enough to gain attention and maintain it even when the promises are not met. The paper identifies the ambiguity and plurality of the common good as strategies of data-intensive healthcare and raises concerns of how this might shape public healthcare in the future. As the plural understandings of the common good might not support each other, the paper calls for further assessments of how this will affect public healthcare's core objectives and for seeking solutions that carefully balance the goals of the current and evolving multi-stakeholder environment of data-intensive healthcare.

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Introduction

From electronic health records to wearable self-care devices, healthcare operations are now mediated through digital technologies that produce vast amounts of digital data that can be used for multiple purposes both inside and outside healthcare. This has required public healthcare to face the opportunities and challenges of the datafication of health, the process of turning qualitative aspects of life into quantitative data that enables online tracking and predictive analysis (Mayer-Schönberger and Cukier, 2013; Ruckenstein and Schüll, 2017; van Dijck, 2014). Scholars have argued that healthcare is now pursuing intensified data sourcing: the practices of collecting, sorting, circulating, and interpreting data from healthcare and making it available for multiple uses at the same time (Hoeyer, 2016, 2019; Hogle, 2016). One aspect of intensified data sourcing is the development of centralized data infrastructures by which sharing data from a single database for multiple purposes is made possible (Hoeyer, 2019; Wadmann and Hoeyer, 2018). Many governments are investing in national or regional electronic health record systems, an initiative that is presented as part of broader attempts to reform healthcare (Morrison et al., 2011). However, research has found the development of these kinds of broader health data infrastructures problematic because it calls for the governance of distributing sensitive health data to new sources (Garrety et al., 2014; Greenhalgh et al., 2011).

Intensified data sourcing changes the relations of healthcare, research, and health data-related business, and these changing relations affect not only how healthcare is delivered but also how health itself is conceptualized. Centralized health records act as part of new emerging data assemblages in which data are collected, extracted, and circulated for a variety of stakeholders (Hogle, 2016). Hogle (2016) defines data assemblages as consisting of multiple parts, including physical infrastructures, data flows, and the human beings collecting and using the data. However, instead of listing every part of such an assemblage, Hogle sees that the importance of thinking about health data assemblages lies in understanding how the process of assembling extends beyond healthcare and involves economic and technological zones of engagement. Emerging health data assemblages form new relations between healthcare, research, government, and industry: the data are expected to improve the quality and effectiveness of healthcare but, at the same time, benefit different stakeholders outside the healthcare context. Studies have shown that opening the digital infrastructures of healthcare to multiple actors might lead to public controversies and unwanted situations when different goals and purposes of data sourcing practices are in conflict (Langhoff et al., 2018; Vezyridis and Timmons, 2017; Wadmann and Hoeyer, 2018). Therefore, research has begun to interrogate the ostensible public benefits of health data and data infrastructures (Aitken et al., 2018; Cheung, 2020).

However, it must be acknowledged that today's intensified data sourcing and health data assemblages are often based on visions of what can be done with the enormous amounts of data that they could bring in and make available in the future. Many of the data-driven improvements of healthcare are still a matter of potential rather than reality (Ruckenstein and Schüll, 2017). Therefore, the motivation for increasing health data is the promise of a better future (Hoeyer, 2019). The sociology of expectations has focused on these kinds of promises and their significance in developing new technologies and infrastructures. Studies have shown that promises and expectations are used to gain resources and provide a structure for the actions involved in developing new technologies (Berkhout, 2006; Borup et al., 2006; Konrad, 2006; van Lente, 2000, 2012). Because of the partly speculative nature of data-intensive healthcare, there is a need to take seriously into account the visions and expectations that are guiding data-intensive healthcare.

This article focuses on one emerging data assemblage, Finland's social services, and healthcare information system project, which is called Apotti. It is the largest and most expensive social services and healthcare information technology project in Finnish history and aims to improve social and healthcare services by introducing a regionally uniform social services and healthcare information system to Helsinki University Hospital and several municipalities in the region of southern Finland. At the core of Apotti is the purchase of an electronic health records system produced by Epic Systems Corporation, which works as a base for building a new, wider data assemblage. During its various stages of development, Apotti has involved various stakeholders and formulated multiple goals for the project. Drawing on the sociology of expectations, I study these different goals as collective expectations (Berkhout, 2006). To understand how these collective expectations become durable and make the development of the health data assemblage possible, I analyse these expectations as justifications based in different common worlds, each of which presents its own understanding of the common good (Boltanski and Thévenot, 1999, 2006; Sharon, 2018). By creating a novel approach with a combination of sociology of expectations and justification theory, I seek to identify the different conceptualizations of the common good that are used to attract stakeholders' interest and support. Drawing on a case study of the Apotti project, I ask how the different conceptualizations of the common good are used in the creation of the new emerging data assemblage. By examining the expectations and justifications, I discuss how the multiple conceptualizations of the common good used add new layers to the objectives of healthcare and how that process might stress the more established aims of providing proper care and improving public health.

Promissory realms and justifications of intensified data sourcing

According to Hoeyer (2019), intensified data sourcing is based on the idea of *promissory data*. Hoeyer argues that attempts to build data-intensive healthcare are a governmental response to the wide set of problems of ageing populations and increasing healthcare costs in Euro-American countries. Intensified data sourcing requires accumulating more and more data, with which researchers and companies can seek data-driven solutions in the future. The data work as a promise for future action but also as a possibility to reject or derail attempts to seek other solutions to the complex problems of today's healthcare (Hoeyer, 2019). The promises of health data are not limited to expectations related to health. For example, public health databases are also presented as a national resource for economic growth (Tarkkala et al., 2019). These expectations and promises are essential to understanding the dynamics of the emerging data assemblages.

The idea of promissory data highlights how the development of new technologies and technological infrastructures is based on expectations of how those could function in the future. This has been emphasized in the sociology of expectations, which has built an understanding of how expectations enable future trajectories and shape the present by guiding future-oriented actions (Berkhout, 2006; Borup et al., 2006; Brown et al., 2000; Konrad, 2006; Sovacool and Hess, 2017; van Lente, 2012). According to Borup et al. (2006), expectations are at the centre of technological development. They provide structure and legitimation, attract interest and investment for technology development, and make it possible for actors to gather stakeholders and resources to develop the technologies they envision (Borup et al., 2006). By working as a source for gaining resources and attracting attention,

expectations also become performative: they form promise-requirement cycles, where the actors stating the promises and expectations need to engage with actions that will help fulfil their promises in the future (van Lente, 2000).

Berkhout (2006) emphasizes that expectation studies are particularly interested in *collective expectations*. Berkhout focuses on the distinction between private expectations and collective expectations. The former are individual's cognitive schemas that individual uses to organize their own actions and make decisions. Collective expectations are publicly stated visions that actors communicate to gain support and resources to achieve their desired future. Berkhout (2006) sees that collective expectations can be understood as 'bids' between different stakeholders: actors use them to garner support and resources to achieve their desired future. To gain acceptance from multiple stakeholders, collective expectations must have enough interpretative flexibility for actors to accept them within the frames of their private expectations.

An important notion revealed by early expectation research is that futures are contested through various expectations (Brown et al., 2000). Some expectations gain attention, while others may be dismissed. To gain support, collective expectations need to be formulated so that they are acceptable on the terms of different stakeholders. But how do expectations become acceptable by the involved stakeholders? To understand this better I supplement the expectations theory with justification theory. I propose that gaining acceptability occurs through a mode of engagement that Thévenot (2000) calls a *regime of public justification*. In that regime, claims need to be formulated in terms of the common good. Boltanski and Thévenot (1999) describe how the need for justification arises from critical moments. In these situations, somebody realizes that something is going wrong and needs to be addressed; support from others must be gained to make the fix possible. If an individual or a group wants to criticize the current situation and change things for the better, they are subjected to the imperative of justification. This means that they need to form acceptable justifications to criticize the existing situation and advocate successfully for change. To be acceptable, these justifications need to be equivalent to the world that they are critiquing, meaning that they need to be formulated so that they are understandable and reasonable to the key people involved.

In *On Justification*, Boltanski and Thévenot (2006) argue that there are multiple established understandings of the common good that people can use when justifying their claims of how things should be. Drawing on classical texts of political philosophy, Boltanski and Thévenot identified six different understandings of the common good, which they call polities. In the present, these polities are manifested in *common worlds*, each of which presents an *order of worth*, a coherent set of vocabulary, objects, and statements of justice and their relations to the common good. Boltanski and Thévenot do not propose that their six-world typology works as an all-encompassing one. They later complemented their original typology with two more common worlds (Boltanski and Chiapello, 2005; Lafaye and Thévenot, 1993) and encouraged others to identify new common worlds (Boltanski and Thévenot, 1999). Drawing on Boltanski and Thévenot's theory, Sharon (2018) analyses how different actors justify collaborating in the multi-stakeholder environment of health research, which is changing because of the appearance of major consumer technology companies in the health and biomedical sectors. Sharon identifies five orders of worth that actors use to conceptualize the common good: *civic* (doing good for society), *market* (increasing economic growth and wealth), *industrial* (increasing efficiency), *project* (enabling innovations), and one new order that Sharon calls *vitalist* (promoting health). Sharon argues that analysing the conceptualizations of the common good provides a rich terrain to understand the morals and values that are affecting current developments in the digital health sector and its connections to the wider landscape of digital capitalism.

According to Boltanski and Thévenot (1999, 2006), although the different orders of worth can find support from other orders, the orders themselves are not unanimous. Some of the common worlds might find shared ground for defining the common good, but other orders might be distinctly contradictory in their conceptualizations. Sharon (2018) argues that concepts of the common good need to be updated to reflect the complexity of present-day digital capitalism. Acknowledging the plurality of the common good helps us rethink and evaluate the current situation and build normative solutions that cherish some of the common goods, such as the civic conceptualization of the common good in healthcare – collective well-being – without violating the others (Sharon, 2018). As I demonstrate below, the common worlds and their orders of worth also provide a fruitful approach to understanding the intensified data sourcing of public healthcare and the collective expectations that guide and justify its trajectories. The vision of the data producing even more precise knowledge is becoming central to the ways health is conceptualized and delivered (Hogle, 2016). Therefore, understanding how such determinations come into being is crucial. The common worlds provide a framework for this examination by evaluating the different goals assigned to the data assemblages, the plurality of those goals, and the effects of this plurality. It considers the multi-stakeholder environment of data-intensive healthcare. As Sharon (2018) argues, instead of simplifying public services as creating only public benefits and private companies as producing only financial gains, the common worlds approach helps us understand how different actors, including public authorities, are building their services and technologies with multiple understandings of the common good.

Methodology and background: the common good and collective expectations of the Apotti project

My empirical study is a case study of the Finnish public social services and healthcare project Apotti, a project that seeks to improve the practices of public social services and healthcare and introduces a new regionally uniform information system to Helsinki University Hospital and several municipalities in the region of Southern Finland. Even though Apotti involves both social services and healthcare, the focus here is predominantly on the healthcare aspect. I studied the project intensively in 2018 by collecting and analysing text materials related to the project and conducting interviews (see Table 1 for description of the research data). This included collecting all of the public promotion materials produced by the project published between 2012 and 2018, official documents of the tendering process of the new information system, decisions of judicial processes of the project's tendering process in Market Court and a concluding report of previous information system project related to the Apotti project. In addition, I interviewed five key actors who had worked on the project since its founding. All of the participants were interviewed as official representatives of the Apotti project, and the interviews were conducted at Apotti's office. The first interviewee was recruited by asking relevant interviewees from the Apotti project's office. The other four interviewees were recruited with snowball sampling by asking the interviewees to name other persons who have been strongly involved in the project from the beginning and shaped its goals and outcomes. At the time of my case study, Apotti was modifying the purchased information system for the Finnish context and preparing for the first introduction of the system, which happened at the end of 2018. Since then, the information system has been introduced to several different social

Table 1 Research data.

Interviews ($n = 5$)			Documents ($n = 232$)
Interviewee	**Date**	**Duration (min)**	**Promotion materials of the project**
P1 Engineer	June 2018	72:44	Bulletins produced by the project published through years 2013–2015 collected from Helsinki City archives, $n = 23$
P2 Physician	August 2018	59:05	Announcements, blog posts and videos posted in Apotti's website during the years 2012–2018, $n = 183$
P3 Social worker	August 2018	53:05	**Public documents**
P4 Physician	September 2018	57:06	Apotti's publicly available decision-making and tendering documents collected from Helsinki municipal council archives, $n = 18$
P5 Physician	September 2018	65:14	Other documents (related earlier health information system project report and Market Court decisions), $n = 4$

services and healthcare units in the area and is intended to be in use in every participating public social services and healthcare unit by the end of 2021.

I started my analysis by reading the documents to get an overall grasp of the Apotti project and understand the phases of the project from the years 2012–2018. I did this while I was preparing the interviews and interviewing the key actors of the project. After completing the interviews, I used the thematic analysis procedure provided by Braun and Clarke (2006) to analyse the interviews. During the project, Apotti attracted many different stakeholders, from social services and healthcare workers to digital start-up companies that were involved as part of the emerging data assemblage. I interpreted these different goals as collective expectations that work as 'bids' between the stakeholders and the project. Theoretically inspired by the ideas of the sociology of expectations and with thematic coding, I identified the collective expectations of the project from the interview data. For data triangulation (Denzin, 1970), I reread the document data to confirm the results of thematic coding. At this point, I realized that the expectations are also grounded in significantly different justifications. Drawing on the common worlds and orders of worth identified by Boltanski and Thévenot (1999, 2006), Boltanski and Chiapello (2005), and Sharon (2018), I identified six different common worlds used to justify the collective expectations. Each collective expectation is based primarily on one of the common worlds, although they all incorporate elements several others.

Apotti started from, in the words of Boltanski and Thévenot (1999), a critical moment, where policymakers decided to try to fix data transferability problems in public social services and healthcare. However, it is impossible to identify exactly who first raised the criticism of the current situation, because the problems were almost certainly acknowledged at different levels of healthcare and policymaking over a long period of time. Every Finnish public hospital has used electronic patient records since 2007 and every public health centre since 2010 (Reponen et al., 2019). Despite having all these established information systems, the data was not readily transferrable from one healthcare or social services unit to another. Even individual hospitals had several special systems that could not communicate with one another, and the data transferability between these systems was less than perfect. Apotti started in 2012 as an attempt to solve these problems through the notion of developing a new regionally uniform social services and healthcare information system. At the beginning of Apotti, the project office and project lead investigated the models available for purchase and concluded that the best way to proceed was to purchase one wide-ranging information system and supplement it with special systems as necessary. This led to a lengthy, two-stage tendering process, which also involved social services and healthcare professionals to evaluate the proposed products. The tendering process began in August 2013, and it was completed finally in April 2016 when Apotti signed a contract with the US-based healthcare software company Epic Systems Corporation to purchase its electronic health records product as a base for the new Apotti information system. The chosen company Epic is one of the leading electronic health record companies in the US. In recent years, its EHR products have been implemented in public healthcare in various European countries, such as UK and Denmark (Allen, 2019; Naughton, 2014). These introductions, including the Apotti purchase and implementation, have been widely debated in the public discussions with critics claiming that the US-based system built around a very different healthcare system does not fit into the context of European public healthcare systems (Allen, 2019).

From the beginning, the Apotti project was identified as a public social services and healthcare transformation project that would purchase, develop, and introduce a new information system as part of other changes and improvements. However, the involvement of many stakeholders has expanded the project's goals and expected results. To be accepted by the stakeholders, these collective expectations around the purchase and implementation of the new health information system need to be justified with acceptable logic. Drawing on the analysis of justifications, I analyse how the collective expectations of Apotti are justified through different understandings of the common good, see Table 2 for a summary. The Apotti system and the new data assemblage around it are expected to empower individuals and improve public health (the civic and vitalist worlds), increase the performance of social services and healthcare workers (the industrial world), renew the social services and healthcare information and communications technology (ICT) markets (the market world), bring opportunities for research and deliver new business possibilities (the project world), and lead to global visibility for Finnish social services and healthcare and society (the world of fame). The different common worlds are used in the expectations to build a comprehensive rationalization of why the new data assemblage needs to be formed. To grasp how each expectation is grounded in a particular common world, I provide an introduction to the common world and show how it is manifested in the collective expectations.

The collective expectations and common worlds of Apotti

Civic and vitalist world: promoting public health and individual well-being. In the objectives of Finnish healthcare, worth is defined as a compromise between the civic and vitalist worlds. Boltanski and Thévenot (1999, 2006) hold that the order of worth in the civic world lies not in individuals but in the collective actions that they undertake for the community instead of caring for their own individual, selfish desires. The Finnish Ministry of Social Affairs and Health describes healthcare's overall objective

Table 2 The common good in the collective expectations of Apotti.

Collective expectation	The expected role of the Apotti system	Common world
Promoting public health and individual well-being	System as part of a wider body of improving services and practices Helping patients and customers take care of their well-being	Civic and vitalist
Providing support and management for healthcare professionals	Automatic and data analysis-based support for work Management of healthcare professionals	Industrial
Changing healthcare information system markets	The new system as one of the best on the market Accelerating market competition	Market
Providing new possibilities for research and business	Providing new data, connections, and tools for research Creating the foundation of a business ecosystem	Project
Making Finnish healthcare system and society more visible	Promoting Finnish healthcare, business, and research at the international level System as part of national technology development	Fame

is to provide a 'sustainable society', which 'requires that everyone is treated fairly, that social inclusion and participation are encouraged, that everyone's health and functional capacity are promoted and that support and services are available' (Ministry of Social Affairs and Health, 2013, p. 7). The objective of a sustainable society is defined using the terminology of the civic world: the outcome of healthcare should be a well-functioning society. However, when this objective is unpacked, it turns out to be more complex and relies on more than just the civic world. Achieving a sustainable society requires that 'the status of the most vulnerable' needs to be improved and that 'the focus must be shifted to promoting health and functional capacity, preventing social and health-related problems and from treating illnesses to the active promotion of well-being' (Ministry of Social Affairs and Health, 2013, p. 7). Here, the state is responsible for producing decent support and services for individuals, but individuals are expected to take charge of their health using the services and support that the state provides. At the same time, the state aims to allocate resources for the most vulnerable to improve their well-being. In that sense, the objective of healthcare is defined in a vitalist sense. The vitalist order of worth grounds the common good on increasing and maintaining the health of both individuals and the social body (Sharon, 2018). Instead of having a bolder ambition for promoting health, it is taken as the primary valuation of common actions. Therefore, in the context of Finnish public healthcare, the objectives are defined by a compromise of civic and vitalist worlds, which are intertwined by the aims of providing a sustainable society on a general level but also trying to allocate services to improve every individual's vitality to the greatest extent possible.

As a project involving public social services and healthcare, the intertwined civic and vitalist orders of worth build a foundation for the justifications of and expectations for Apotti. One indicator of this is the framing of Apotti as a project that will improve social services and healthcare. In the first public announcement posted on the project's website, the new information system is described 'as a part of a wider body of improving the services and practices of social and healthcare'. Instead of framing the project only through the introduction of a new information system, this claim emphasizes that the new information system is being deployed because of the overall—civic and vitalist—goals of improving healthcare and well-being. Although Apotti introduced other justifications and expectations during the later stages of the project, it has generally continued to frame the development of the new data assemblage in the terms and goals of the core objectives and the values of social services and healthcare.

The intertwined vitalist and civic worlds and the division of responsibilities between individuals and social services and healthcare authorities are clearly demonstrated in the expectations for Apotti that call for empowering those using social services and healthcare to take better care of their health. The new information system has an integrated digital client portal that gives patients and clients opportunities to contact social services and healthcare professionals online and browse and register their own health and well-being data. This digital portal is being marketed to encourage clients and patients to take a more active role and behave as 'partners' in well-being and healthcare instead of being passive clients and patients. At the same time, because active patients and clients can promote their health and well-being using the new digital services, professionals are expected to have more time for those who need their care and time the most.

Industrial world: supporting and managing professionals. Apotti aims to increase the quality and safety of social services and healthcare with the new information system. Although these expectations can also be interpreted in the terms of the civic and vitalist orders of worth by increasing the possibilities for individual and collective well-being, the terms *quality* and *safety* are part of the industrial world, where the common good is conceptualized around increasing performance (Boltanski and Thévenot, 2006). The world is based on standardization and quantitative metrics that measure the efficiency of its functions. Worth leans on professionalism, which needs to be channelled to take advantage of all the human capabilities that are available. An increase in value in the industrial order means improving performance through optimization, standardization, and management of the workers, with a minimum of distractions and anomalies (Boltanski and Thévenot, 2006).

Apotti is engaged with the industrial world in the expectations of how the new information system will offer a possibility of supporting, tracking, and managing social services and healthcare professionals' work. The system is expected to support those professionals through automated data analysis. For example, it is claimed that the system will search and automatically analyse customer and patient data, make operative suggestions, and remind social services and healthcare professionals of critical work tasks. The system will automatically search and analyses customer and patient data and bring them to the professional's desktop for each appointment. Apotti also provides an integrated decision-making support system that links patient data to medical information and creates patient-specific guidelines, reminders, and links to care recommendations. In these expectations, the common good of Apotti is defined as increased performance among workers, which relies on the automated support of the system.

Boltanski and Thévenot (2006) describe how the state of worthiness is related to control in the industrial order of worth. In

the industrial world, the state of unworthiness is related to a lack of control over operations. The Apotti system is expected to direct professionals to act in certain ways. For example, one of the physicians (P4) working in Apotti interviewed for the present study explained that there are specific situationally related procedures and workflows in the system that will automatically provide guidelines for action. Another interviewee (P2) explained that this would lead to a situation where 'it is easier to do like the system guides than do otherwise'. Apotti has also been presented as a tool for management. Real-time data collected from the whole region using the system makes it possible to practice centralized data-driven management. Workers are expected to enter client or patient data into the system during each appointment for it to be immediately available to other workers and units. Therefore, as the interviewed social worker (P3) explained, Apotti will also make the work of managers and leaders easier, because 'they can keep track of everything from their screens online'. Real-time data is also expected to enable comparisons of the work of individuals and units. On the whole, therefore, the Apotti system is expected to make social services and healthcare more controllable and predictable by guiding professionals in those fields to act in a standardized manner.

The new system providing new possibilities to social services and healthcare clients and professionals is also justified in the terms of the industrial world. One argument that is repeated in Apotti's promotional materials, is that those in most need are responsible for most of the costs of social services and healthcare: 'Research shows that 10% of the whole population are causing 80% of the costs of social and healthcare, and 60% of those are using both social and healthcare services'. With the new information system, these services are expected to be targeted more effectively to this small group of people that most burdens the social services and healthcare. This proposes a tension between industrial, civic and vitalist worlds. It sets an intertwined civic and vitalist aim by prioritizing the services for those who need more help. However, this aim is justified through the industrial world: helping this small group is seen as a matter of reducing costs by optimizing their service use, not as a matter of improving health and well-being.

Market world: the system purchase as an attempt to fix the market. The market world defines worthiness through competition. In that world, actors are buyers and clients who are seeking to negotiate the most prize-worthy outcome with the sellers, the other actors in the market. The common good is based on competition and wealth (Boltanski and Thévenot, 2006). In the expectations for Apotti, the market world was used to justify purchasing the core system from the American supplier because of its superior position in the market.

From the first days of the project, the need for a new information system has been articulated through the failures and problems with existing information systems. Some interviewees connected these problems to the oligopolistic structure of the Finnish social services and healthcare information system markets, which has developed because of previous public purchases that had favoured Finnish ICT companies and systems tailored to a specific area of social or healthcare. The Apotti purchase is explained as an attempt to remedy this situation by doing the purchase differently to shake up the current market structure. The interviewees noted that most existing public social services and healthcare information systems had been purchased from a few large Finnish ICT companies, which has led the market, in the words of one interviewee (P1) to 'an unfavourable situation', where 'the quality of the information systems did not correlate with the prices'. Apotti's proposed solution to the ICT problems was to purchase a ready-made information system product. The tendering process was made so that international ready-made information system products could be included in the competition.

The supplier's success in international markets and broad customer base, terms closely intertwined with the market world, were defined as indicators of the product's credibility and trustworthiness. For example, one of the interviewed physicians (P5) saw the broad international customer base as an indicator of the system's continuous development: 'The system will be developed regardless of us because the provider has 390 customers around the world and over three million end-users and the development needs are very similar in Euro-American countries.' Although Apotti's main goal in introducing the information system was to respond to social service and healthcare needs, collective expectations exist regarding how the purchase is expected to change the structure of the information systems market. The purchase from a successful international company is hoped to open up that market and accelerate the competition between existing companies. In one of the blog posts published on the project's website in February 2016, Apotti's Chief Technology Officer celebrated the anticipated changes in the market: 'One positive thing is that the new actor challenges settled firms in the market, which have been developing their systems with public resources in a notably closed market environment. It challenges these firms to think about their products and procedures and seek new solutions.' Here, the common good is defined as increasing competition among providers and better outcomes anticipated in the future through this competition. However, despite the promises of changing the market, the new Apotti system resembles the existing health information systems provided by Finnish companies. In Finnish public discussions, many critics of the project have claimed that the system purchased from Epic is just a similar alternative to the existing systems, and it would not provide any change to the market situation, except excluding Finnish companies from the competition.

Project world: information system as a source for innovative action. After completing the tendering process and concluding a contract with the provider, Apotti emphasized how the new information system will benefit the Finnish research and business landscape by providing data for researchers and companies and an application programme interface (API) for companies to develop products that could be integrated into the Apotti system. Here, the data in the system and the API work as a source for inspiration and innovation, terms that Boltanski and Chiapello (2005) identified as belonging to the project world, where the common good means increasing innovative actions thanks to experimentation, creativity, flexibility, and the people who are creating connections and networks for these kinds of actions. The common good is based on innovative action, especially innovations that seek to build new networks (Boltanski and Chiapello, 2005; Sharon, 2018). The expectations for the system in terms of promoting Finnish research and business engage with this world. However, as a public information system, Apotti is not undertaking this kind of action itself; rather, the new system is framed as a bountiful source of innovative action by the research and business sectors.

Apotti has highlighted how implementing an internationally sourced, high-quality information system enables new connections and possibilities for health research. The interviewees brought up opportunities for research with the new information system and its data. One interviewee (P5) highlighted how the data from the information system could easily be integrated with

other data sources, such as register data or financial management data, to create new big data sets for research: 'The possibilities are endless. We could, for example, do research on which area has the highest diabetes II morbidity and does that correlate with the unemployment rate, smoking or something else'. The information system also provides new properties for data gathering through its platform. The information system has research features that are claimed to enable better integration of health research data gathering with the daily operations of social services and healthcare. For example, the information system could automatically prompt professionals to ask patients and clients to participate in ongoing research during appointments or search for potential participants from the database and automatically send invitations for research participation. One interviewee (P4) discussed possibilities for cross-national research by, for example, 'collaborating with John Hopkins by integrating our data and their data' or, if Finland's population is not large enough for studying rare diseases, researchers 'could ask other Epic user hospitals to also gather data'. Through these claims and expectations, the role of the system in health research and population sciences is framed as a source of discoveries, more data, and deeper international connections.

In the terms of the project world, Apotti has discussed the purchase of Epic's monolithic EHR product as an opportunity for new connections and possibilities for Finnish business. Although Apotti has faced critiques on excluding Finnish companies during the tendering process out of the competition, it later framed the US-based system purchase as an opportunity for Finnish markets. After concluding a contract with the system supplier in 2016, Apotti launched a search for corporate partners to join its ecosystem, especially for 'eHealth, eWellness, and social care companies, which produce or utilize new data and knowledge in their actions'. The goal of the ecosystem is to integrate new digital services as part of the Apotti system and provide opportunities for firms to expand by selling their services to other users of the same information system around the world. In a newsletter released in December 2018, Apotti states that its goal is to build an open ecosystem that companies could join free and use its 'sandbox test environment' for testing and experimenting with their business ideas. At the end of 2018, Apotti announced that they had almost 90 partners in the ecosystem, with about 10 partners already using the test environment. One interviewee (P1) explained how the idea of the ecosystem is constantly evolving: 'The goal of building the ecosystem was formulated only after the purchase when we knew what we could do with the new system. It is still developing. Our goal is to get the maximum benefit out of it, and we still may not know what that is.' This kind of flexibility and openness to constant change is, according to Boltanski and Chiapello (2005), at the core of modern capitalism and its project world. In the project world, the Apotti system is defined as a continuously changing assemblage that works as an enabler for 'networkers'—the researchers and businesses—to create new connections, to experiment, and to create innovative and even disruptive actions.

The world of fame: making Finnish society world-famous. In analysing the expectations, I also identified an additional order of worth, which was visible in all of the expectations and promises of the Apotti system: the order of fame. The world of fame defines the common good as based on the opinion of others and how others recognize a given being. According to Boltanski and Thévenot (1999, 2006), worthy people in this world are those that are well known by traditional standards: celebrities, journalists, politicians, other opinion leaders, and the like. In the expectations for Apotti, it was not people whose prestige was highlighted; rather, the Apotti system was framed as a potential source of fame for Finnish social services and healthcare, research, and business.

The introduction of the new information system will purportedly bring visibility to Finnish social services and healthcare. In Apotti's promotional materials, it has highlighted its unique position of being the world's first regionally uniform information system that covers both public social services and healthcare. The project materials indicate that, although other similar information system projects are being undertaken in Northern Europe, Apotti is on the vanguard of connecting social services and healthcare with the uniform system and seeks to blaze a trail way for others.

The purchase of a globally successful information system product is also expected to offer other possibilities to gain global visibility and renown: the system is already widely recognized and used around the world. An Apotti blog post from August 2017 emphasized that buying from a well-known supplier gives access to a whole new 'community, including hundreds of the world's best healthcare units, which share best practices and care protocols with one another through the system'. Here, access to the global community using and participating in the development of the system is expected to elevate Finnish social services and healthcare to this best-in-class tier. Access to this information system's global community is also anticipated to bring renown to Finnish businesses. Through APIs, Finnish companies will have the opportunity to develop new digital applications and systems that could be marketed globally to other users through the EPIC application store.

The order of fame overlaps with other justifications and is even used to support justifications in the other orders of worth. Besides Apotti, other public digitalization and data infrastructure projects have used this kind of justification technique, which can be viewed as a form of branding. For example, Hoeyer (2019) and Tupasela (2017) observe how Nordic countries brand their public data infrastructures as unique data sources for population sciences. On the other hand, the Finnish government has expressed ambitions of 'Finland leading the way into the age of artificial intelligence' by accelerating technological development in the business and public sectors in various fields, including social services and healthcare (Ministry of Economic Affairs and Employment of Finland, 2019). These objectives appear to be building a national vision of a society that seeks to be a global leader in the digitalization of the public sector. In the world of fame, this kind of branding is considered essential to distinguish oneself from others in the competition for attention and visibility (Boltanski and Thévenot, 2006).

Discussion

I have conceptualized Apotti as an emerging health data assemblage. The concept of a data assemblage highlights how the infrastructures and practices of intensified data sourcing are not developed solely to fulfil the needs and aims of healthcare and how the different visions, actors, and practices participating in it are involved in how health itself becomes conceptualized and delivered (Hogle, 2016). Different purposes are assigned to digital systems of healthcare, and new actors are brought in to be part of these emerging infrastructures (Langhoff et al., 2018; Vezyridis and Timmons, 2017; Wadmann and Hoeyer, 2018). By drawing on these notions and combining expectations studies with justification analysis, I explained how one health data assemblage is developed. The sociology of expectations theory complements the emerging understanding of the prospective nature of datafication and intensified data sourcing. In addition, Boltanski and Thévenot's (2006) orders of worth and Sharon's (2018) application of those help to unpack this in more detail by showing how the

collective expectations of data-intensive healthcare are based on multiple common worlds that do not rely on each other. Because of this multiplicity, it is important to think about how these different worlds can coexist with one another and how they also might collide and create tensions in the field of healthcare and its operations.

The interpretative ambiguity of the data assemblage. The collective expectations of the Apotti project support Hoeyer's (2019) notion of promissory data. The possibilities of the new data work as a complex, multifaceted promise for a better future. As Hoeyer (2019) says, the promise of data also works as a possibility to avoid actions in the present. Apotti promises that it will provide more efficient, safer, and higher-quality healthcare. Although several units began to use the system after my case study, many of the expected benefits of the new system have not been realized. Thus far, Apotti has promoted how the system is already improving quality and safety in some units that are using the system. However, a recent study investigating nurses' experiences of information systems in Finnish healthcare found that nurses using Apotti gave meaningfully lower grades to that system than nurses using other systems (Kyytsönen et al., 2020). In addition, many have regarded the previous implementations of Epic's EHR system to European public healthcare contexts as unsuccessful (Allen, 2019; Naughton, 2014). Apotti emphasizes that most of the benefits will occur only after time has elapsed. In an Apotti's announcement from October 2020, the project's Managing Director claimed that adapting to the new system will take time and therefore, the benefits of the system might be visible only after years of use (Apotti, 2020).

The development of the system provides an excuse not to seek solutions outside of technical domains because it promises that the desired improvements will eventually appear; until then, it is necessary to use the system and produce more data as evidence for these changes. Some of the benefits of the new system, especially the goals that can be easily quantifiably measured, can be proven rapidly after the introduction of the system. With other expectations, it is hard to see whether the promises will ever become true because they do not offer clear definitions of when they can be regarded as reached. How can one say, for instance, have the markets changed for the better or do patients feel more empowered by using the new system, as there exists no clear consensus on how these aspects are measured and validated? Yet, with a datafication mindset, even these completely ill-defined aspects can be framed as problems of not having enough data; intensified data sourcing is promoted to provide possibilities to create novel measurements and knowledge from completely explorative analysis of large datasets. The sourcing creates a paradoxical cycle that justifies all actions related to it.

The expectations formulated before the introduction of the system are indicators of an uncertain data-intensive future that is not yet completely realized and might not ever come to pass. Therefore, expectations matter. They guide the trajectories of forming the data assemblages at a practical level by attracting interest and resources, but they are also used to justify the system when it is not still working, and might not ever work, as promised. Berkhout (2006) emphasizes that expectations need to be interpretatively flexible enough so that actors can fit them into their private expectations. However, what I see in the expectations of the emerging health data assemblage is that they need to be formulated not only to be interpretatively flexible but they also need to be interpretatively ambiguous enough to avoid disappointments when everything is not working as promised. Thus, the ambiguity makes the promises durable also when the data assemblage is in use, but the benefits of the health data remain largely speculative.

The plurality of the common good as a technique of intensified data sourcing. Although the Apotti project initially frames itself as a social services and healthcare project, there exist expectations that do not align with this claim. Expectation studies have described how futures become contested through expectations either gaining or not gaining support from stakeholders (Brown et al., 2000). The interpretative flexibility and ambiguity provide room for expectations to be justified using different understandings of the common good without clear collisions of the common worlds and their critiques of one another. The ambiguity enables the aims of the data assemblage to be so loose that different actors can support the assemblage without needing to acknowledge all the common goods at stake. This is crucial, as the assembling always happens in particular political and historical moments and involves actors from specific political and economic zones (Hogle, 2016). To make such a complex assemblage durable, it needs to be open-ended such that all the different participants, from healthcare professionals to private companies, involved in the assembling can remain part of it, even though their private goals might differ widely. Therefore, the plurality of the common good is a technique of intensified data sourcing.

Nevertheless, this multiplicity of the common good might create tensions between actors in data-intensive healthcare. Thus, it is important to ask how the different expectations might stress the more established understandings of the common good in healthcare. Previous research has shown that accumulating purposes and actors can lead to public controversies regarding or even the collapse of infrastructure (Langhoff et al., 2018; Wadmann and Hoeyer, 2018). This accumulation might not only create tension, but it can also shape the ideas of the common good in the context of public healthcare. Finnish public healthcare aims for social sustainability, which calls for public authorities to provide proper services and individuals to take care of their health to the best of their abilities and aligns with the civic and vitalist worlds. However, some of the expectations for Apotti are justified largely through other common goods. Even though one world is dominant in each collective expectation, all the expectations incorporate several orders of worth. For example, the aims of improving the safety and quality of healthcare can also be interpreted as aiming for the vitalist goal of ensuring better health. The same is true of expectations from the project world. Creating possibilities for new health-related innovations and discoveries in health research can be seen as indirect possibilities for improving health. However, as Boltanski and Thévenot (1999, 2006) and Sharon (2018) have made clear, the common worlds and their understanding of the common good are not unanimous and, when different worlds collapse, there is a need to find a compromise between the worlds. Some of the common worlds draw on different perspectives that do not have a common ground for such compromise. How, for example, does one find support for civic or vitalist worlds from the world of fame, where the common good is defined as the positive opinions of others?

What remains uncertain is the long-term outcomes of the plurality and ambiguity of the common good. What is the role of different expectations and understandings of the common good when intensified data sourcing is still framed as improvements of healthcare? Are the various common goods used only to attract different actors or are they paving the way for changes in the core objectives of healthcare? Does public healthcare need to make compromises with the different actors in the future? These questions call for careful assessment of the objectives of public

healthcare when new public digital data infrastructures are built and maintained. There may not be collisions between the different objectives at present, they might arise in the future, as the data-intensive healthcare and its data assemblages evolve.

Conclusions

As the Apotti case shows, the introduction of new data-intensive technologies formulates new purposes and goals for healthcare. The expectations of the data assemblage are justified in the terms of different common worlds. All these goals are not aligned with the established core objectives of public healthcare based on the civic and vitalist worlds, the attempts to guarantee the best possible health for individuals and sustainable society. As intensified data sourcing is promissory, it is uncertain what are its long-term consequences. The role of the civic and vitalist understanding of the common good is partly unclear in data-intensive healthcare; it seems to be at least partly taken for granted in the context of other goals that are not primarily associated with these core objectives. Therefore, it is important to consider the civic and vitalist worlds and ask what their role is. Should those be somehow protected and even cherished when public digital infrastructures are thought to serve multiple stakeholders at the same time? For instance, the aim for global renown points out how some of the purposes and aims go far beyond the field of healthcare and link data-intensive healthcare to the wider goals of national technological development. Thus, these kinds of conceptualizations of the common good call for thinking of how much intensified data sourcing is based on fulfilling more general economic and political promises related to data-intensive technologies instead of serving the needs of healthcare. Data-intensive healthcare needs to be thought of in the wider frame of digital capitalism. A multi-stakeholder environment is an essential part of today's digital capitalism, and healthcare is no exception. It is essential to study the new goals that are pursued with data-intensive technologies and consider whether they collide with the core objectives and functions of healthcare. If anything, the challenge is to build solutions that face the multiple common goods head-on and find a balance between them.

Data availability

The dataset generated during the research is not publicly available due to the privacy agreement between the author and the interviewees, as required by the Finnish National Board on Research Integrity TENK guidelines. The anonymized dataset (in Finnish) is available from the author upon reasonable request.

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Additional information

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