Institutionalization of Digital Innovation Practices in Large and Complex User Organizations

Anne Kristin S. Ajer
Department of Informatics, University of Oslo
akajer@ifi.uio.no

Egil Øvrelid
Department of Informatics, University of Oslo
egilov@ifi.uio.no

Abstract

Digital innovation (DIN) is crucial for managing the steady growth of resource use in the hospital sector. DIN includes the co-creation of novel services, such as digital remote care (DRC) solutions. Our empirical setting, consisting of 27 hospitals in Norway, is characterized by a complex organizational structure with an overall centralized IT governance, but not for the DRC initiatives. In the healthcare sector, there is limited knowledge of organizational practices to empower DIN at local levels in the intersection of central and local governance. Our in-depth case study exploring 70 different DRC trajectories reveals the interplay among three key mechanisms in a productive local DIN environment – idealistic entrepreneurship, organizational anchoring, and remote infrastructure – which reflect DIN practices. Our contribution to the DIN literature is a dynamic model showing the interplay among these key mechanisms, which increases the innovation pace, improves the innovations' scalability, and makes organizations robust in implementing DIN practices.

Keywords: Digital innovation practices, digital remote care, hospital, institutionalization.

1. Introduction

Since the 18th century, the hospital has largely existed as a geographically fixed knowledge institution with a form of monopoly on healthcare (Foucault, 1973). Later, the invention of technologies such as x-ray, ultrasound, and sophisticated surgery has modernized healthcare extensively (Sandelowski, 2000). Throughout the 20th century, increasingly sophisticated technologies were developed to support and strengthen various treatment trajectories. These are usually framed as information systems (IS), which are essential for transforming healthcare (Drucker, 2007; Kellermann & Jones, 2013), reducing society's total expenses, and at the same time, providing citizens with improved care experiences and better healthcare (Berwick et al., 2008).

However, the continuous advance in medical practices and technology has resulted in a variety of information and communication technologies (ICTs) sourced from various vendors, including systems for patients' electronic health records (EHRs), laboratory systems, logistic systems, sensors, diagnostic facilities, and medical automation (Aanestad et al., 2017a). Ensuring smooth information flows across the ICT landscape is not only pivotal for healthcare delivery but also quite challenging (Romanow et al., 2012).

In the beginning of the 21st century, the growth in the number of patients and increasingly demanding patients impose new burdens on a hospital, which are difficult to handle in its existing institutional form (Kelly & Young, 2017; Piening, 2011). Even if technology has made it possible for many treatments (that previously required hospitalization) to be performed on outpatients (Hove, 2020), there is a politically driven desire for more treatments to take place in patients' homes (Ministry of Health and Care Services (MHCS), 2019). Thus, there is the need to relieve the workload of the geographic location-based hospital institution.

Fortunately, digitalization provides new opportunities, such as digital remote care (DRC). By DRC, we refer to the activities performed when the follow-up with the patient is moved outside a healthcare institution and enabled through digital systems. Under the umbrella of DRC, we include video consultations, chats, records of measurements and questions to monitor status, receiving treatment plans, and other relevant information. DRC is a suitable approach to cope with the elderly population and the subsequent increased demand for new hospital services and the rise in cost that this implies.

However, moving services out of the hospital is a challenging endeavor, with the plausibility to introduce a new regime with new organizational structures to prepare the new offerings, offer faster decisions, empower the employees to innovate, empower the vendors to participate, and many other issues.

HICSS

Information security, safe treatment, and treatment quality outside the hospital are also new areas to address.

In this paper, our aim is not to point out all of the practical efforts and the challenges to overcome but to observe what occurs in organizations when the new reality with DRC strikes them. The transition from performing treatment onsite the hospital to the patient's home probably depends on the inclusion of important characteristics of the classical form of the institution in its new form. Often, the local clinician and the local hospital are those best suited to establish a secure relationship between the hospital and the patient at home. However, what does it take to put this in place? How can the set of changes become a more permanent part of the organization?

Based on these concerns, our question is as follows: *What are the key mechanisms used to institutionalize digital innovation (DIN) practices in large user organizations?*

To address this question, we explore the emergence of DRC solutions in a total of 70 different initiatives in 9 health trusts (HTs) consisting of 27 hospitals. We discuss our findings using institutional logics, which offer a huge potential to understand this complex socio-technical healthcare environment (Shaw et al., 2017; Thornton & Ocasio, 2008).

We contribute to the DIN literature by identifying and exploring what we frame as DIN practices and how they become institutionalized.

The rest of this paper is structured as follows. We outline the conceptual background in Section 2 and describe the research design in Section 3. We then present our findings and analysis in Section 4, followed by a discussion in Section 5. Finally, in Section 6, we conclude the paper.

2. Conceptual background

Inspired by the new institutional theory, (DiMaggio & Powell, 1983; Thornton et al., 2012), we describe how DIN practices can be built and established. We use the emergence of DRC solutions in a regional hospital in Norway as a case to build our empirical evidence.

2.1. Digital remote care

We have not found a common term for the concept that refers to patient care outside a healthcare institution, enabled by digital technologies. *Digital and remote care* is used (Braune et al., 2021) and *digitally enabled remote care*, *telehealth*, and *telemedicine* are other terms (Kaye et al., 2020). Until recently, the Norwegian Directorate of Health (2022) used the term *medical distance follow-up*, but now it has switched to *digital*

home follow-up. Since the dialog between the patient and the caregiver can be held in other places than at home, we suggest using the term *digital remote care (DRC)*. We find that the definition from the Directorate of Health (Directorate-of-Health, 2022) covers the meaning we have found in our empirical data; DRC "includes the activities/actions that enable that the patient, outside the traditional arenas where patients meet healthcare professionals, can acquire, register and share clinically relevant information about their state of health electronically, for the purpose of providing information or guidance for the patient's self-mastery, and/or provide decision support diagnosis, treatment or follow-up for healthcare professionals" . Under the umbrella of DRC, we include video consultations, video cameras for closer examinations (e.g., of wounds), chat-transcripts, records of measurements (directly from sensors or manually reported via a digital tool) and questions to monitor status, treatment plans, and other relevant information. Some are supposed to be inpatients but stay at home, but most DRC solutions are for those who normally go to hospitals for regular follow-ups. Many DRC solutions seek to support the whole care pathway. "Care pathways are generic instruments, designed to manage a patient with a particular disease or condition (e.g. stroke)" (Dent & Tutt, 2014, p. 182).

When we examine the emergent local DRC solutions, these are user-oriented lightweight IT systems that support a faster innovation pace than heavyweight IS, which are typically the stable core business systems that have a slow innovation pace (Baldwin & Woodard, 2009; Bygstad & Øvrelid, 2021).

2.2. Institutionalizing digital innovation practices

In our study, we use the definition of DIN "*as the co-creation of novel offerings through the recombination of digital and/or physical components*" (Hukal & Henfridsson, 2017, p. 361). We conjecture novel offerings as new digital systems and new work processes, and we also include human beings in physical components.

Research on DIN has a long tradition in information research, but the digital aspect has properties that allow recombination and value co-creation that go beyond traditional innovation; in this regard, more research is needed (Hukal & Henfridsson, 2017). The IS community has paid attention to the role of digital technology itself (Hund et al., 2021), and the tactics that entrepreneurs can employ to pursue DIN have been described (Henfridsson & Yoo, 2014). However, researchers should examine how DIN influences the organizations so they can manage the complexity of

what DIN entails, for example, cutting across architectural layers (such as contents, service, network, and device), building new collaboration and new governance structures to align with emerging supra-organizational forms, such as platforms (Hukal & Henfridsson, 2017). Furthermore, Nambisan et al. (2017) argue that "most complexities associated with the interdependence of outcome and process organization are ignored" (p. 226). Complementing this concern, Hjorth and Reay (2022) state, "[One should study] how new forms of organizing can be created in an already organized world that is characterized by established ways of doing and thinking. In addition, [study] how some forms of entrepreneuring may create new organizational and institutional arrangements, and new organized worlds" (p. 160).

To address these research gaps, we seek to understand the mechanisms that shape an environment for DIN in the highly institutionalized hospital sector. We suggest that the ways in which the focal organization adapts to empower a DIN environment can be called DIN practices (Selznick, 1957).

Nevertheless, how to shape institutions as organizational structures, including the work processes and practices (Selznick, 1957), can diverge among different occupations and professions (Powell, 1991). Essential actors, with sufficient power and interest, in such work, are called institutional entrepreneurs (DiMaggio, 1988). Structural elements of organizations, such as DIN practices, are institutionalized "when they are widely understood to be appropriate and necessary components of efficient, rational organizations" (Tolbert & Zucker, 1983, p. 26).

The actors in the institutional lifecycle can be organizations, groups of organizations, individuals, or groups of individuals (Battilana et al., 2009). In this study, we adopt Battilana and colleagues' (2009) view of "institutional entrepreneurs as change agents who, whether or not they initially intended to change their institutional environment, initiate, and actively participate in the implementation of changes that diverge from existing institutions" (p. 70).

Thus, we find it relevant to use an institutional perspective in order to understand why the key mechanisms that we have identified are important in relation to the institutionalization of DIN practices.

3. Research design

This research is designed as a qualitative case study of the phenomena of DIN practices related to DRC in the hospital sector. By studying nine hospital HTs, we gain access to several cases to compare the different hospitals, and we obtain rich details to understand how DIN practices have emerged (Patton, 2014).

3.1. Research site

In Norway, hospitals are public and organized as HTs allocated to a regional health authority. We study the South Eastern region (SERHA), with 11 HTs (9 hospital and 2 service units) that have 81,000 employees and an annual turnover of 88.5 billion NOK. The region's ICT operations are supported by the Hospital Partner HT.

Investments in ICT are made at both the regional and the local levels. The need for care services at home (MHCS, 2019; SERHA, 2018) has given the hospitals an opportunity for DIN in the way that patient services are delivered.

DRC is not a new topic. Some of the HTs have provided telehealth support for many years. Nevertheless, the COVID-19 has been a catalyst for clinicians' and healthcare managers' awakening about the worthiness of DRC. Traditionally, the SERHA has centralized IS governance, with limited autonomy for the HTs. However, the SERHA currently lacks arrangements to govern DRC initiatives, and we observe that local initiatives suffer from their limited capability to reach the production stage and the necessary scale. Thus, we have found it timely to examine the conditions required for local DRC initiatives to progress from idea to production.

3.2. Data collection

We collected data for this study by interviewing informants from nine HTs in the SERHA. In the paper, the HTs are anonymized (using the names of gems). The informants were identified by contacting the HTs' chief information officers (CIOs), searching for and reading articles on DRC initiatives on the HT's and other relevant websites, and approaching the participants of a conference. Thus, we used a purposeful sampling strategy to "identify people with great knowledge and/or influence (by reputation) who can shed light on the inquiry issues" (Patton, 2014, p. 268). The interviewees' positions included CIOs and project or program managers. All project managers were either nurses or physicians.

We conducted 17 interviews with 19 individuals from October 2021 to March 2022. The interviews lasted 47 minutes on average and were held as video conferences. First, we mentioned the DRC initiative we had read about and we asked if they knew additional initiatives. Further, we asked about each DRC initiative (which patient group/s, how the initiative was started and organized, its status, vendors, other actors involved, integration, financing, challenges, and benefits). Furthermore, we inquired about how the DRC was governed and about the challenges posed to the

initiatives. After obtaining the participants' consent, we recorded and transcribed all interviews, except one, where we took notes instead.

We used secondary data, specific to DRC initiatives (n = 46), from the hospitals' websites, and national and regional strategy documents and reports (n = 49). In November 2021, a national conference was held, where many sessions had DRC as a theme. The sessions were available online afterward, and 16 relevant speeches (ranging from 5 to 20 minutes) were transcribed, while notes were made from some speeches and debates.

3.3 Data analysis

Transcripts of and notes from the interviews and the conference, as well as online documents specific to DRC initiatives, were uploaded to NVivo (a tool for data analysis). The codes in NVivo were added on the fly for the first-cycle coding (Miles et al., 2014). We kept an overview of the various projects in Excel.

Table 1. Mechanisms for digital innovation practices

Key mechanism	Description
Idealistic entrepreneurship	Managed by an institutional actor striving to develop digital innovation practices using or acquiring malleable existing technology (Battilana et al., 2009; Hukal & Henfridsson, 2017).
Anchoring	An environment and culture for innovation should be present to obtain financial and organizational support. Otherwise, the project dissipates, is put on hold, or is restarted with new arrangements (Ajer et al., 2021; Øvrelid & Bygstad, 2019).
Remote infrastructure	A mature digital infrastructure that enable connection between the patient home and the hospital, to facilitate safe patient-doctor interaction. A remote infrastructure is able to both release and secure interactions, as well as enable access for actors that is deemed as trustworthy (Bygstad & Øvrelid, 2021; Ghazawneh & Henfridsson, 2013).

We continued to compare the data and discuss the common characteristics of the HTs that had more initiatives than others. We observed that some cases were more successful than others, and wanted to identify the main reasons for this. Through a retroductive process, we identified around 10 mechanisms. After reflecting on the explanatory power related to the empirical evidence of each of them, we were left with three (Bygstad et al., 2016). We saw that the three key mechanisms enabled an interplay to build an innovative environment (see Table 1). In the next subsections, we illustrate the importance of and the interrelations among the key mechanisms.

4. Key mechanisms for institutionalization of digital innovation practices

From our data collection related to the 9 HTs, we found 70 DRC initiatives, where 38 were in production, 16 in the pilot phase, 10 in the planning stage, and 6 had been terminated. Three key mechanisms were recurrent and were assessed to be of prominent significance regarding an initiative's ultimate fate.

The first mechanism is *idealistic entrepreneurship*. All the DRC initiatives we found were typically based on an idea from a practicing clinician, who was usually the one who managed the project and made substantial efforts beyond ordinary work hours to make the project progress. It also implied types of work and knowledge outside one's profession.

The second mechanism is *anchoring*. Anchoring is reflected by top management support, when the executive management has a positive impact related to an initiative. Such support can take the form of local funding, approval of resources, or approval of new organizational structures to support a DRC initiative. Some support structures are organized into a program, and others involve a team in a line organization.

The third mechanism is *remote infrastructure*, so the new one can adapt to the organization's current information infrastructure (II). This includes sufficient integration and must be approved by the actual organization to connect with the current II.

We have observed similarities across the hospitals in how the dynamics among the three key mechanisms spur innovation. We have chosen to present the findings with three illustrative cases from three different HTs (see Table 2).

4.1. Case 1: Topaz HT

Topaz HT is one of the smallest HTs in the region. Its only initiative (besides video consultations) had been canceled but indicates well the key mechanisms that push an initiative and those that hinder it.

Idealistic entrepreneurship. The initiative was related to digital support for home dialysis and was started by a physician and embraced by the nurses and the patients.

"It was one of the kidney doctors who was very interested in getting some solutions. [...], then we had a dialogue with [a local company engaged in healthcare and ICT] if we could come up with something together around home dialysis patients" (development director).

According to the development director, it is imperative that the professional communities are interested and want the change since they are the ones that drive the development. In this case, represented by a physician as an idealistic entrepreneur who started the process.

Anchoring and remote infrastructure. Notwithstanding goodwill and help from the development department, the initiative was terminated. The development director explains the main reasons:

"They [clinicians] still had to do some double work, double registrations, because we did not have

integration, either to the patient journal or to the system for ordering dialysis fluid. [...] We got very limited funding for the project. We have a director who was the former finance director, and I am responsible for innovation, but I have zero NOK in the budget. Funding has to be applied for separately for each innovation initiative."

To achieve proper integration and connect the remote infrastructure to the existing one, the Hospital Partner must be involved. The director told us that they had a dialog, but the service would be too expensive, given the zero budget, and the Hospital Partner was not eager to have yet another system to support.

The Topaz case shows that idealistic entrepreneurship is in place, but not anchoring and remote infrastructure.

Table 2. Matrix showing the presence or absence of the three key mechanisms for digital innovation

Case	Idealistic entrepreneurship	Anchoring	Remote infrastructure (RI)	Outcome
1 Topaz	*Present* A clinician gets a project into the pilot phase with clients onboard.	*Absent* No internal budget or organizational structure for the digital remote care (DRC) initiative.	*Absent* The RI needed integration which was not accomplished.	*No innovation* Project canceled, DRC innovation put on hold.
2 Jade	*Present* Several dispersed initiatives. Some clinicians stand out as a driving forces.	*Present* A specific DRC organization, organized as a project.	*Absent* Different choices of systems and integration needed were only partially accomplished.	*Slow innovation pace* Struggled to get initiatives started or to advance from pilot phase to production.
3 Emerald	*Present* Both clinicians and administrative personnel stand out as idealistic entrepreneurs.	*Present* A specific DRC organization, organized as a program.	*Present* A choice of one RI from which to innovate, which has sufficient integration.	*Steady innovation.* Continuous new initiatives in production.

4.2. Case 2: Jade HT

Jade HT is one of the largest HTs in the region. It has many DRC initiatives, but most of them are still projects in the pilot phase or not yet started at all. Many have external funding but have several obstacles to overcome before eventually going into production.

Idealistic entrepreneurship. One system, related to an asthma tuner, is in production in one clinic. The initiative is managed by a physician. When the pilot phase was successful, the physician asked the Jade clinic manager to use the system in the hospital, which the latter approved.

The asthma tuner is a small project, but there are complicated processes before it can go live, and it can be exhausting for those who operate the project. The following statement illustrates some of the unforeseen tasks that can confront an idealistic entrepreneur:

"I started the method evaluation in February– March 2021 and finished it in May [...]. It was a big job with a structured literature review, economic evaluation, and risk and vulnerability analysis. I had not anticipated it [all the work]; it was much more than I had imagined, so only very interested people would bother to do it" (physician, Jade HT).

Thus, we understand that the entrepreneur meets unforeseen obstacles and need to be idealistic to continue with the entrepreneurship.

Anchoring. Jade HT has recently established a project named Jade Home that is intended to help entrepreneurs in DRC. Nevertheless, in large hospitals, it can be difficult to make everyone aware of new services:

"I did not know that there was an innovation department until May–June, [...] but they have rather helped me a lot afterward to try to spread it out in the clinic [...]. I think they have a very important role to support deeply engaged people because along the way, you get very fed up" (physician, Jade HT).

From this we can conjecture that a supportive organizational arrangement will keep the idealistic entrepreneur to chase the idea.

Remote infrastructure and anchoring. In one of the clinics, an idealistic entrepreneur, a nurse, is involved in four different DRC projects. However, in three of the projects, the clinic intend to use a platform that is not approved in Jade HT. Additionally, some of the funding has time limitations:

"The platform we plan to use is not approved by Jade [...]; we depend on finding a solution soon because we must start spending the money by April. [...]. And if we do not find it and things are not approved, then we must send the money back, and the project must be terminated. [...] but we are now trying to find other solutions" (nurse and project manager, Jade HT).

Moreover, the infrastructure in Jade HT is hampering the progress:

"Jade HT is probably very special. I know that both Opal HT and Emerald HT have achieved a lot, so I think that Jade HT likes to feel very special and unique and that we have a different infrastructure than many other HTs. I do not know the technical [side], but it certainly makes innovation projects difficult to start" (nurse and project manager, Jade HT).

The Jade HT case shows that idealistic entrepreneurship is in place, likewise with organizational anchoring, but there is a problem in integrating the new with the current II.

4.3. Case 3: Emerald HT

Emerald HT is a medium-sized HT and has the largest number of DRC initiatives in production.

Idealistic entrepreneurship and anchoring. In Emerald HT, a physician was a pioneer in DRC through a project that she called "the child of my heart". In collaboration with a platform vendor, she developed a system to follow up on patients with epilepsy. The project manager came from the Hospital Partner. While this project was ongoing, Emerald established a DRC program (in mid-2020) to align with its technology strategy, where mobility and distance were among the areas of focus. The project manager became the program manager.

The physician pointed to organizational anchoring and support from committed actors as success factors:

"Good anchoring with the management and support from there are completely alpha and omega, that it is highlighted as a priority and that [the management] continuously informs the health personnel group [...]. Furthermore, there is a need for some resource persons and drivers who believe in this way of working and who can take the lead. I will point to the program manager; he was an important resource person in that [early] phase" (physician, Emerald HT).

We conjecture that both the program manager and the physician are idealistic entrepreneurs.

The management has given legitimacy to the DRC program to encourage further innovation:

"[...] there are quite long distances between the hospitals and where the patients are. Therefore, we have organized this as a program and worked systematically in all hospitals, down to the wards and in the clinics" (research and innovation director, Emerald HT).

Remote infrastructure and anchoring. There are several sources of funding for DRC projects, including public sector organizations (regional, national, and the European Union) and some ideal/private foundations. However, the solution's survival when the project period is over is uncertain, and there is a struggle for prioritization in receiving the Hospital Partner's help with integration issues. For this reason, some HTs have purchased their own platforms to develop sustainable solutions. In relation to the epilepsy project, Emerald HT bought a platform and thus paved the way for new patient groups.

The program manager in Emerald HT explained that the platform had the functionality that met the needs of many clinics, and its systematic approach was a success factor for spreading its use across clinics:

"To use the platform on a new patient group is very easy in terms of process, and we have spent time on fine-tuning the process. We have a clear progression plan and activity plan on everything to be done from A to Z [...]. So we standardize the process so that it takes as little time and effort as possible [...], so we try to create a good practice for implementation" (program manager, Emerald HT).

In the beginning of 2022, Emerald HT had also recruited local DRC managers in the clinics to serve as supervisors. We can interpret this as top management support since Emerald HT has the resources; additionally, the program manager pinpointed top managers as champions for DRC:

"The management challenges the clinics to come up with new proposals for new areas where both video and the type of self-registration can be used. So there is a strong focus on looking for new areas. Then we [in the DRC program] have been very outgoing and sold this in. [...]. And new initiatives come from the clinics, from the professional community itself, when we have shown how this can work, and we refer to others' experiences, so it is the professional community that is the driver."

This case shows that an idealistic entrepreneur is important in the early phases. We also recognize that this is intertwined with organizational anchoring. Even if the chosen platform does not have integration other than the facility to transfer pdf files to the EHRs, it is a sufficient part of the overall infrastructure to scale.

4.4. Summary

Our findings suggest that the three key mechanisms – idealistic entrepreneurship, organizational anchoring, and remote infrastructure – must be present to provide continuous production of innovative solutions or to institutionalize DIN practices. We have summarized our findings in Table 2. We see that in Topaz HT, only idealistic entrepreneurship is present; thus, there is no innovation. Jade HT has both idealistic entrepreneurship and organizational anchoring but lacks a remote infrastructure. The lack of strategy hinders initiatives from being started, and if these have been launched, it is problematic to advance from the pilot phase to production; thus, the innovation pace is slow. In Emerald HT, all three key mechanisms are in place, and it has a steady stream of innovation projects.

5. Discussion: Digital innovation practice

The underlying mechanisms that institutional entrepreneurs apply when their ideas related to DIN are challenged by the environment are described in the IS literature (Henfridsson & Yoo, 2014), but this is valid only for one innovation, not for a series of innovations that we aim to explore.

The key mechanisms used to institutionalize DIN practices have different responsibilities, but the interrelation among is what gives the intended outcome. We suggest there are dynamics among the key mechanisms that have to be taken care of in the governance structures to create an environment for innovation. Thus, we propose a variance model (see Figure 1) that focuses on the situated context that triggers change, as well as the key mechanisms that form DIN practices and produce their outcomes (Pawson et al., 1997).
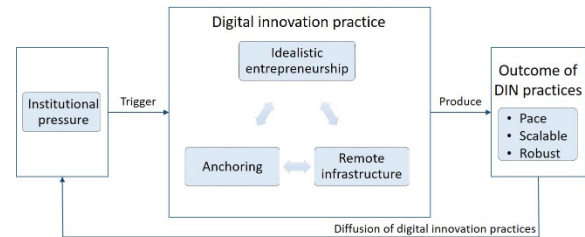

Figure 1. The dynamics in a local governance model for an innovative environment

Institutional pressure is what triggers organizational change (DiMaggio & Powell, 1983; Scott, 2014). The most recent national plan for hospitals put regulative pressure on hospitals to take advantage of digital technology to provide patients with hospital services in their homes and to make them active assistants (MHCS, 2019). When some hospitals are successful in their initiatives, such as the epilepsy program in Emerald HT, this can form a mimetic pressure on other hospitals to facilitate their DIN practices. Likewise, experiences with positive outcomes in a hospital can exert cultural pressure to further institutionalize its DIN practice. For the last two scenarios, the figure illustrates this with the arrow going back from the outcome.

A DIN practice is formed by three key mechanisms in a dynamic interplay.

The first key mechanism is *idealistic entrepreneurship*; it means that many of the innovations come from discoveries or ideas by enthusiastic clinical entrepreneurs. However, they are confronted with substantial work and many obstacles that they have not expected. This situation may cause them to give up or be reluctant to continue with innovation around their work.

The clinical entrepreneurs have an institutional logic, with patient focus and quality of healthcare as the driving forces (Jensen et al., 2009; van den Broek et al., 2014). Prior research has pointed to tensions arising from clinicians' trust issues concerning implemented systems enforced by a central governance strategy with a top-down approach (Ajer et al., 2019; Baroody Jr & Hansen, 2012; Boonstra et al., 2017). In our data, we do not find tensions related to trust issues or the quality of the systems stemming from a top-down approach and the introduction of systems that do not fit the logic of care. This suggests that a bottom-up approach is fruitful for reducing tensions among the logics involved. Nonetheless, we observe tensions due to the absence of the necessary integration, in line with prior research findings (Jensen et al., 2009). We also identify tensions *between* the medical profession's logic that promotes medical autonomy and the decisions made closest to the point

of care *and* IT professionalism, where IT goals, determined by strategies, standards, and expert knowledge, form the basis for legitimacy (Boonstra et al., 2018; Hansen & Baroody, 2019). The clinical entrepreneurs have a difficult time understanding why their organizations cannot have several platforms for DRC, and they are dissatisfied with waiting for decisions that sometimes take so long that the funding has expired. However, the idealistic entrepreneur sometimes explores new options to continue the innovative process (Henfridsson & Yoo, 2014).

A lesson learned is that the idealistic entrepreneur is unaware of either the organizational or the ICT complexity. Nonetheless, the initiatives have a good starting point when it comes from clinicians. Organizational support can mitigate entrepreneur burnout. One measure to support the idealistic entrepreneur is to have an organizational structure that can help with the tasks that are way beyond the scope of the clinical profession's daily work. This structure is part of the second key mechanism, anchoring.

Anchoring is characterized by top management support, proper funding, and the establishment of a new organizational structure.

The establishment of new organizational structures requires top management support. Since DRC is perceived as a remedy to reduce cost, this is aligned with the logic of cost control by healthcare managers (Baroody Jr & Hansen, 2012; Reay & Hinings, 2009), and together with the government's regulative pressure to transfer treatment to patients' homes, it can sway the top management to support such initiatives. The central task is to support and streamline the process from idea to production. Especially, it is important to support the administrative tasks (legal, risk and vulnerability analysis, applying for funding). Furthermore, the new DRC organization is useful in advocating the possibilities for DRC across the clinics. When clinicians recognize its usefulness to their colleagues, they gain interest, and as ordinary employees, can contribute to innovations. This interest can be explained by the institutional logics for healthcare personnel in four ways. First, it can be because of the care logic, where the patient as a person is at the forefront (avoid time-consuming and complicated travel) (Plumb et al., 2017). Second, it can make sense due to a possible increased performance (Jensen et al., 2009). Third, it can apply to the status logic, so the healthcare personnel would avoid being "deemed 'old-fashioned' if they did not follow the current trend" (Handayani et al., 2016, p. 27). Fourth, it can apply to the logic of personal advantage by recognizing it as an opportunity for career advancement (Handayani et al., 2016). Nonetheless, we conjecture that the professional

community's interests and actions have brought legitimacy and anchoring to the DRC practice (Hjorth & Reay, 2022).

However, the funding structure for the hospitals and the dependence on the shared ICT operational organization constrain the managers' ability to make large investments. Therefore, appropriate funding is another characteristic of anchoring. Without financial resources to attain the necessary integration, there can be resistance to using the system because of inefficiency (double registration and checks in other systems). Suboptimal systems do not fit healthcare managers' logics of work optimization and quality of care (Jensen et al., 2009); thus, it is not that strange that the initiatives can be blocked with such arguments. Time-limited funding in such a complex environment is also problematic. The projects are sometimes not started due to organizational obstacles, and the initiative is set aside as the budget will be unavailable(Øvrelid & Bygstad, 2019).

The lessons learned are that it is crucial that projects are empowered to start, have continuity in their development, and fulfill the need for sufficient integration. These require financial predictability and anchoring upwards in the IT governance structure.

The third key mechanism, *remote infrastructure*, enables integration with core systems in both hospitals and primary care organizations. Thus, the remote infrastructure has three distinctive characteristics. First, it must fulfill the security requirements of the current II (Ghazawneh & Henfridsson, 2013) Second, it has a flexible architecture where new modules can easily be built (Yoo et al., 2012). Third, it is installed base friendly (adaptable and cooperative) in relation to the current infrastructure (Aanestad et al., 2017b).

We suggest that a remote infrastructure in healthcare should be connected to the infrastructure of both hospitals and primary care organizations (e.g., the primary care physicians' EHRs. We consider these important so the patients do not have two apps to operate.

The outcome of a DIN practice is an environment with a continuous production of productive innovations, meaning that the pace of innovation is increased, the innovations are scalable, and when the DIN practice is institutionalized, a *robust* organization is in place to embrace new ideas.

The anchoring and remote infrastructure mechanisms as means to quicken the *innovation pace* are in line with the finding on how to support two-speed DIN where lightweight DRC solutions are developed at a higher speed and with a more agile approach than the heavyweight core systems (Bygstad & Øvrelid, 2021). If the remote infrastructure is

installed base friendly it may facilitate further *scaling* within the hospital region (Aanestad et al., 2017b).

6. Conclusion

With case studies in the hospital sector, we have illuminated and outlined a variance model to answer our research question, which was to find the key mechanisms to institutionalize DIN practices in large user organizations. We find three key mechanisms forming a DIN practice: idealistic entrepreneurship, anchoring, and remote infrastructure. Our contribution to the DIN research stream is a model of a DIN practice leading to an increased pace of production of productive scalable innovations (see Figure 1). In this way, we also contribute to organizational studies by showing how entrepreneurship of new organizational structures unfolds over time and how institutionalized practices can empower employees to innovate.

For practice, we offer four lessons learned to speed up the pace of innovation: (1) Create a DRC organizational structure to support the idealistic entrepreneur. (2) Ensure financial predictability, and (3) secure anchoring upward in the IT governance structure. (4) Make the remote/new infrastructure appropriate for integration with the current II.

A limitation of the study is that the model applies to healthcare settings, but we suggest that the model is applicable to large professional user organizations in general. This is an avenue for further research.

7. References

Ajer, A. K., Hustad, E., & Vassilakopoulou, P. (2019). Enterprise Architecture in Hospitals: Resolving Incongruence Issues. *Studies in health technology and informatics*, *264*, 659-663.

Ajer, A. K., Hustad, E., & Vassilakopoulou, P. (2021). Enterprise architecture operationalization and institutional pluralism: The case of the Norwegian Hospital sector. *Information Systems Journal*, *31*(4), 610-645.

Baldwin, C. Y., & Woodard, C. J. (2009). The architecture of platforms: A unified view. *Platforms, markets and innovation*, *32*, 19-44.

Baroody Jr, A. J., & Hansen, S. W. (2012). Changing perspectives: Institutional logics of adoption and use of health information technology. International Conference on Information Systems, ICIS 2012, Orlando, FL.

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: towards a theory of institutional entrepreneurship. *The Academy of Management Annals*, *3*(1), 65–107.

Berwick, D. M., Nolan, T. W., & Whittington, J. (2008). The triple aim: care, health, and cost. *Health Affairs*, *27*(3), 759–769.

Boonstra, A., Eseryel, U. Y., & van Offenbeek, M. A. G. (2018). Stakeholders' enactment of competing logics in IT governance: polarization, compromise or synthesis? *European Journal of Information Systems*, *27*(4), 415–433.

Boonstra, A., van Offenbeek, M. A., & Vos, J. F. (2017). Tension awareness of stakeholders in large technology projects: a duality perspective. *Project Management Journal*, *48*(1), 19–36.

Braune, K., Boss, K., Schmidt-Herzel, J., Gajewska, K. A., Thieffry, A., Schulze, L., Posern, B., & Raile, K. (2021). Shaping Workflows in Digital and Remote Diabetes Care During the COVID-19 Pandemic via Service Design: Prospective, Longitudinal, Open-label Feasibility Trial. *JMIR Mhealth Uhealth*, *9*(4), e24374.

Bygstad, B., Munkvold, B. E., & Volkoff, O. (2016). Identifying generative mechanisms through affordances: a framework for critical realist data analysis. *Journal Of Information Technology*, *31*(1), 83-96.

Bygstad, B., & Øvrelid, E. (2021). Managing two-speed innovation for digital transformation. *Procedia Computer Science*, *181*, 119-126.

Dent, M., & Tutt, D. (2014). Electronic patient information systems and care pathways: The organisational challenges of implementation and integration [Article]. *Health informatics journal*, *20*(3), 176-188.

DiMaggio, P. (1988). Interest and agency in institutional theory. In L. G. Zucker (Ed.), *Research on Institutional Patterns and Organizations: Environment and Culture* (pp. 3–21). Ballinger.

DiMaggio, P., & Powell, W. W. (1983). The iron cage revisited: Collective rationality and institutional isomorphism in organizational fields. *American Sociological Review*, *48*(2), 147–160.

Directorate-of-Health. (2022). *Digital hjemmeoppfølging - Sluttrapport fra nasjonal utprøving 2018 - 2021*. helsedirektoratet.no. https://www.helsedirektoratet.no/rapporter/digital-hjemmeoppfolging-sluttrapport-fra-nasjonal-utproving-2018-2021/pdf-av-rapporten/Digital%20hjemmeoppf%C3%B8lging%20-%20sluttrapport%20fra%20nasjonal%20utpr%C3%B8ving%202018-2021.pdf

Drucker, P. (2007). *Management challenges for the 21st century*. Routledge.

Foucault, M. (1973). *The birth of the clinic* (2nd ed.). Routledge.

Ghazawneh, A., & Henfridsson, O. (2013). Balancing platform control and external contribution in third-party development: the boundary resources model. *Information Systems Journal*, *23*(2), 173-192.

Handayani, P. W., Hidayanto, A. N., Ayuningtyas, D., & Budi, I. (2016). Hospital information system institutionalization processes in indonesian public, government-owned and privately owned hospitals [Article]. *International journal of medical informatics*, *95*, 17-34.

Hansen, S., & Baroody, A. J. (2019). Electronic Health Records and the Logics of Care: Complementarity and

Conflict in the US Healthcare System. *Information Systems Research*, Articles in Advance, pp. 1–19.

Henfridsson, O., & Yoo, Y. (2014). The liminality of trajectory shifts in institutional entrepreneurship. *Organization science*, *25*(3), 932-950.

Hjorth, D., & Reay, T. (2022). Organizational and Institutional Entrepreneuring: Introduction to the Special Issue. In (Vol. 43, pp. 159-177): SAGE Publications Sage UK: London, England.

Hove, I. H. (2020). *Flere pasienter og færre senger*. Statistisk sentralbyrå. Retrieved 02 June from https://www.ssb.no/helse/artikler-og-publikasjoner/flere-pasienter-og-faerre-senger

Hukal, P., & Henfridsson, O. (2017). Digital innovation–a definition and integrated perspective. In *The Routledge companion to management information systems* (pp. 360-369). Routledge.

Hund, A., Wagner, H.-T., Beimborn, D., & Weitzel, T. (2021). Digital innovation: Review and novel perspective. *The Journal of Strategic Information Systems*, *30*(4), 101695.

Jensen, T. B., Kjærgaard, A., & Svejvig, P. (2009). Using institutional theory with sensemaking theory: a case study of information system implementation in healthcare. *Journal Of Information Technology*, *24*(4), 343–353.

Kaye, R., Rosen-zvi, M., & Ron, R. (2020). Digitally-Enabled Remote Care for Cancer Patients: Here to Stay. *Seminars in Oncology Nursing*, *36*(6), 151091.

Kellermann, A., & Jones, S. (2013). What it will take to achieve the as-yet-unfulfilled promises of health information technology. *Health Affairs*, *32*(1), 63–68.

Kelly, C. J., & Young, A. J. (2017). Promoting innovation in healthcare. *Future healthcare journal*, *4*(2), 121.

MHCS. (2019). *Meld. St. 7 (2019-2020) Nasjonal helse- og sykehusplan 2020-2023*. regjeringen.no Retrieved from https://www.regjeringen.no/contentassets/95eec808f0434acf942fca449ca35386/no/pdfs/stm201920200007000dddpdfs.pdf

Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). Sage Publications.

Nambisan, S., Lyytinen, K., Majchrzak, A., & Song, M. (2017). Digital Innovation Management: Reinventing innovation management research in a digital world. *MIS Quarterly*, *41*(1).

Patton, M. Q. (2014). *Qualitative research & evaluation methods* (4th ed.). Sage.

Pawson, R., Tilley, N., & Tilley, N. (1997). *Realistic evaluation*. Sage.

Piening, E. P. (2011). Insights into the process dynamics of innovation implementation: the case of public hospitals in Germany. *Public Management Review*, *13*(1), 127-157.

Plumb, J. J., Hains, I., Parr, M. J., Milliss, D., Herkes, R., & Westbrook, J. I. (2017). Technology meets tradition: The perceived impact of the introduction of information and communication technology on ward rounds in the intensive care unit. *International journal of medical informatics*, *105*, 49–58.

Powell, W. (1991). Expanding the scope of institutional analysis. In W. W. Powell & P. J. DiMaggio (Eds.), *The new institutionalism in organizational analysis* (pp. 183–203). Sage.

Reay, T., & Hinings, C. R. (2009). Managing the Rivalry of Competing Institutional Logics. *Organization studies*, *30*(6), 629–652.

Romanow, D., Cho, S., & Straub, D. (2012). Editor's Comments: Riding the Wave: Past Trends and Future Directions for Health IT Research. *MIS Quarterly*, *36*(3), iii–x.

Sandelowski, M. (2000). *Devices & desires: Gender, technology, and American nursing*. UNC press books.

Scott, W. R. (2014). *Institutions and Organizations: Ideas, Interests, and Identities* (4th ed.). Sage Publications.

Selznick, P. (1957). *Leadership in administration: A sociological interpretation*. Harper & Row.

SERHA. (2018). *Regional utviklingplan 2035*. Retrieved 1.06.2021 from https://www.helse-sorost.no/Documents/Store%20utviklingsprosjekter/Regional%20utviklingsplan_endelig%20og%20godkjent%20versjon.pdf

Shaw, J. A., Kontos, P., Martin, W., & Victor, C. (2017). The institutional logic of integrated care: an ethnography of patient transitions. *Journal of health organization and management*, *31*(1), 82-95.

Thornton, P. H., & Ocasio, W. (2008). Institutional logics. In R. Greenwood, C. Oliver, K. Sahlin, & R. Suddaby (Eds.), *The Sage handbook of organizational institutionalism* (pp. 99–128). Sage.

Thornton, P. H., Ocasio, W., & Lounsbury, M. (2012). *The institutional logics perspective: A new approach to culture, structure, and process*. Oxford University Press on Demand.

Tolbert, P. S., & Zucker, L. G. (1983). Institutional Sources of Change in the Formal Structure of Organizations: The Diffusion of Civil Service Reform, 1880-1935. *Administrative science quarterly*, *28*(1), 22–39.

van den Broek, J., Boselie, P., & Paauwe, J. (2014). Multiple Institutional Logics in Health Care: 'Productive Ward: Releasing Time to Care'. *Public Management Review*, *16*(1), 1–20.

Yoo, Y., Boland Jr, R. J., Lyytinen, K., & Majchrzak, A. (2012). Organizing for innovation in the digitized world. *Organization science*, *23*(5), 1398-1408.

Øvrelid, E., & Bygstad, B. (2019). The role of discourse in transforming digital infrastructures. *Journal Of Information Technology*, *34*(3), 221-242.

Aanestad, M., Grisot, M., Hanseth, O., & Vassilakopoulou, P. (2017a). Information Infrastructures for eHealth. In M. Aanestad, M. Grisot, O. Hanseth, & P. Vassilakopoulou (Eds.), *Information Infrastructures Within European Health Care: Working with the Installed Base* (pp. 11–24). Springer.

Aanestad, M., Grisot, M., Hanseth, O., & Vassilakopoulou, P. (2017b). Strategies for building eHealth Infrastructures. In M. Aanestad, M. Grisot, O. Hanseth, & P. Vassilakopoulou (Eds.), *Information Infrastructures within European Health Care* (pp. 35-51). Springer.