INSTITUTIONAL LOGICS AND INNOVATION IN TIMES OF CRISIS: 
TELEMEDICINE AS DIGITAL ‘PPE’

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Responding to Crisis through Digital Innovation: Emerging Practices, Organizational Impact, and Societal Implications

Eivor Oborn, WBS University of Warwick

Nirit Pilosof, Cambridge Digital Innovation, CJBS and Hughes Hall, University of Cambridge

Bob Hinings, University of Alberta Business School, University of Alberta; Haskayne School of Business, University of Calgary.

Dr. Eyal Zimlichman, Deputy Director General, Chief Medical Officer, Chief Innovation Officer and Manager of the ARC Innovation Centre at Sheba Medical Center, Israel.

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ABSTRACT

How do crises shape digital innovation? In this paper we examine the rapid adoption of digital telemedicine technologies in an Israeli hospital with a focus on the role of the institutional logics held by the stakeholders responding to emerging events. With the onset of COVID-19, the need for social distancing and minimal physical contact challenged and interrupted hospital practices. In response, remote audio-visual functionality of digital technologies were appropriated in different ways, as stakeholders – state actors, managers, health professionals, and family members – sought to improvise and enhance the protection of persons concerned. We show how emerging practices were guided by the dominant institutional logics of stakeholders responding to the crisis. Acting for many as a digital form of ‘personal protective equipment’ (PPE), the technologies enabled diverse action possibilities to become manifest in practices. We add to understanding the role of institutional logics in directing the attention of stakeholders to shape digital innovation in times of crisis.

Key words: COVID-19, Crisis, Telemedicine, digital innovation, Healthcare, technology affordance, Institutional Logics

INTRODUCTION

This paper examines how a crisis event shapes innovation development through the use of digital technologies in a healthcare organisation. Specifically, we adopt an institutional logics perspective to provide insight into this process of digital innovation. We define crisis as “a low-probability, high-impact situation that is perceived by critical stakeholders to threaten the viability of the organization” (Pearson & Clair, 1998: 66). During a crisis, normal practices, routines and processes are disrupted (Pearson and Clair 1998). As such, crises are inconceivable, unscheduled, and unexpected (Williams et al 2017). The literature suggests that the key challenge for individuals and organisations facing a crisis is responding
appropriately through *readjustments* and *recovery* in their emergent organising (Williams et al. 2017). We thus suggest that crisis situations are open to rapid innovation, with established ways of working replaced by alternative practices guided by institutional logics and with little time for extended deliberation.

In our case, we focus on innovation using digital technologies (Nambisan et al. 2017; Hinings et al. 2018) that lead to new processes and services within a healthcare organisation faced with the sudden onset of the COVID-19 global pandemic. The crisis provides a rather unique and rich context to examine the heightened speed of innovation in adjusting and recovering from the perceived threat. Our informants referred to this as ‘going into battle mode’, a situation which allowed us to apprehend and make sense of the institutional logics in shaping the emerging responses in these times of crisis.

Institutional logics, the ‘beliefs and practices that guide and shape individual/organizational identities and actions (Thornton, Ocasio, & Lounsbury, 2012)’ are important filters of attention that activate goals and schema for individuals to act on, thus guiding how technology is taken up. We suggest that institutional logics are drawn on by actors to guide sense-making processes in responding to an emerging crisis, known to affect an individuals’ information processing capability and sense-making (Pearson and Clair 1998; Weick 1993). Logics can thus be important in directing actions during the organisational recovery and adjustment of work practices and influence digital innovation. For example, institutional logics can shape which problems or issues get attended to and which goals are prioritised (Thornton 2004; Lounsbury 2007) as digital technology – technology that uses new algorithms or applications to solve problems – becomes critical for innovation in responding to a crisis.
In this short paper, we attend to a subset of the societal level logics as set out by Thornton et al (2012:73), which we specify more fully below. Healthcare organisations are institutionally complex (Greenwood et al 2011; Reay and Hinings 2009; Scott 2000) and thus embed several competing institutional logics. In our study, we focus on how groups of actors draw on diverse logics as they mobilise material and social resources made available in digital technologies, in responding collectively to the crisis. Our analysis examines the ideal type logics associated with the State, Profession, Corporation and Family and how these enabled different forms of digital innovation. In so doing, we contribute insight into how logics can direct the attention of organisational actors – which we refer to as stakeholder groups – in their use of digital technology as they adjust and recover their practices in response to crisis.

We draw on the case study of rapid innovation at Sheba Medical Centre (MC) in Israel where digital technologies were used to cope with the first wave of COVID-19 patients. Specifically, we refer to technologies for remote audio-visual communication, which were denoted as telemedicine technologies by many local actors, though they expanded the more traditional understanding and interpretation of ‘telemedicine’ as being a subset of health IT that refers specifically to remote clinical services. We show how these technologies, sensitised by the logics of the diverse stakeholder groups, were reinterpreted and adjusted to form innovative practices that enabled organisational recovery from the crisis.

In the following section, we provide a brief overview of institutional logics and how they can be linked to digital technology innovation through the concept of affordances. We then provide a brief overview of our methods and case context, illustrate our theoretical ideas, and conclude with our key contributions, implications for practice and directions for future research.
LITERATURE SYNTHESIS: LOGICS AND DIGITAL TECHNOLOGY

Institutional logics, embedded within institutional orders, distinguish between different areas of social life on the basis of their “symbolic systems” and “ways of ordering reality” that make the “experience of time and space meaningful” (Friedland and Alford 1991, p. 243). Each logic has “a set of material practices and symbolic constructions which constitutes its organizing principles and which is available to organizations and individuals to elaborate” (Friedland and Alford 1991, p. 248). For example, frameworks for norms, identity and authority are understood differently in the corporation and the family, thus reality is ordered differently in these two logics. Logics, which are part of the institutional arrangements, are pivotal in deciding whether, and how, new practices gain acceptance (Hinings et al 2018; Faik, Barrett and Oborn 2020). Thornton et al. (2012; 90) suggest “focus of attention” as a means by which logics shape practices: “institutional logics guide the allocation of attention by shaping what problems and issues get attended to and what solutions are likely to be considered”.

A number of institutional logics can guide action in health organisations (Reay and Hinings 2009; Scott et al 2000; Dunn and Jones 2010). Synthesising our understanding of societal logics from Thornton et al (2012), and other scholars, (Faik et al 2020; Reay and Hinings 2009), in this paper we focus on the State logic which privileges the governing of national interests, a Corporate logic which privileges bureaucratic efficiency and control, a Professional logic which privileges expertise and collegial association, and a Family logic which privileges loyalty and honour of kin. Meanings link actors to action (Zilber 2002). Drawing on the diverse possible logics, we suggest that healthcare stakeholder groups can associate different meanings with the digital technologies they have at their disposal when
readjusting their practices to recover from a crisis. The prevailing institutional logic directs the various stakeholders to apprehend the actions required for the innovation task, and thus makes different resources accessible through the digital technology. The varying patterns of accessibility and activation thus can lead to diverse uses of the same digital technology, and thus different forms of digital innovation.

Faik and colleagues (2020) recently developed a theoretical integration of the mutual influence between digital technology and institutional logics to account for the non-deterministic way that logics can influence technology use. They posit that the concept that most closely reflects ‘focus of attention’ as a mechanism through which the materiality of digital technology can translate into practices is that of ‘affordances’. In this way, they position technology affordances as a conceptual link in the recursive relationship between institutional logics and digital technology. Literature concerning technology affordances - goal oriented actions that are enabled (or constrained) through the materiality of technology - point to an open ended set of possible uses for digital technology, and thus enabling a range of innovation in practices to be associated with a digital technology (Zammuto et al 2007, Hultin and Mähring 2014, Leonardi 2011). Affordances are neither a property of the artefact, the user, nor the context of use, but a property of the relationship between them (Faik et al 2020; Leonardi 2011; Zammuto et al. 2007). People construct affordances as they reconcile their goals with the materiality of a technology (Leonardi 2013). Further, these affordances activate the logics prevalent in a stakeholder group (Faik et al 2020) to influence actions taken in digital innovation.

As individuals draw from the dominantly accessible logics in their interactions with technology, they focus their attention on specific IT affordances which non-deterministically guide their improvisation and technology appropriation. At the same time, technology affordances, such as the ability to visualise a person at a distance, prompt the users to activate
specific institutional logics. For example, users drawing on a family logic are more likely to focus their attention on technology uses that support a family dynamic, such as using visual images to strengthen family bonds. Our study aims to show how institutional logics direct users’ attention to readjust their practices in ways that accord with the logic dominant in their stakeholder group and thereby guide organisational recovery associated with rapid innovation in response to a crisis.

**CASE CONTEXT**

The study focuses on Sheba Medical Centre at Tel Hshomer, the largest hospital in Israel ranked ninth best among 50 Medical Centres in 21 countries (Newsweek, 2020), supported by the ARC Innovation Centre that was created in 2019 to Accelerate innovation and Redesign healthcare by Collaborating with partners from the healthcare industry. ARC was set up to support innovation in the hospital complex but is also involved in international collaborations. The presence of the ARC made Sheba a unique healthcare organisation to study because the Innovation Centre embedded a wider range of stakeholders within the healthcare ecosystem than might normally be found in other hospitals. During the COVID-19 crisis, the ARC Innovation Centre connected a number of stakeholder groups around digital technology use, including state level actors (the Ministry of Defense and the Israeli Defense Force (IDF)), corporate actors (technology firms, industry partners and hospital executives), professionals (medical doctors and nurses), and end users (patients and their family). Two members of the author team are part of a wider collaboration with ARC which examines innovation ecosystems more broadly. One member of the author team is a leading director at ARC and in Sheba MC.
The surge of telemedicine use in Sheba MC illustrates dramatic digital innovation in response to crisis with the threat of COVID-19 patients overloading hospitals. During the first few months of COVID-19, digital technologies with video conferencing capabilities surged into use for a range of purposes. A senior Director explained: “The model of the ARC innovation center was efficient in reutilizing existing technologies for other purposes, such as the InTouch Telepresence robots developed for tele-ICU or Tytocare developed for homecare that were used in the inpatient COVID-19 units”.

We contacted and gained access to Sheba MC and the ARC Innovation Center as research partners in June 2020 and conducted 30 interviews with physicians, nurses, executives and ARC collaborators from the MedTech industry. Most interviews were conducted in Hebrew and translated. We also collected media coverage and attended 8 English language webinars wherein individuals from Sheba MC described their various service innovations to healthcare centres in North America, Europe and Asia. These centres were seeking to learn from Sheba’s varied and rapid adoption of technologies and innovate in their own sphere. One co-author also participated in a guided tour of the hospital and on-site observations of the COVID-19 units operations. We have slightly modified the titles or role labels for the respondents below to preserve anonymity.

CASE INSIGHTS

We illustrate how the State, Corporate, Professional and Family logics, embedded within the healthcare field, focused stakeholders’ attention on different ways to innovate with technology and produce remarkably different action possibilities and adjustment practices in the first wave of the pandemic. Prior to COVID-19, these digital technologies were
predominantly used at Sheba for outpatient care in the community, rather than for inpatient activities at the hospital.

**State logic and technology affording national pandemic control**

The state logic has been characterised as basing its norms in national citizenship, following a strategy of widespread community good and deriving its authority through bureaucratic domination (Thornton et al 2012). Further, a state logic has been linked with focusing the stakeholders’ attention on the possibilities for using technology to widen the range of actions that can be traced by state institutions (Davidson and Chismar 2007; Faik et al 2020).

The first COVID-19 patients arrived in Israel from the “Diamond Princess” cruise ship, and were deemed a threat to national safety, given the unknown reach and consequences of the disease. In response, as the largest governmental hospital in Israel, Sheba MC was asked by the Ministry of Health to treat the newly arriving COVID-19 patients in an effort to keep all other citizens ‘safe’ and enhancing the good of the national community. These patients were kept isolated in an adapted facility adjacent to the hospital where they were remotely monitored by hospital staff from a designated ‘tele-tent’. As a medical director explained, “it was more ambulatory than hospitalisation because they were not really patients. There were people who came from the cruise ship and thus exposed to the virus… an at-home quarantine in the hospital.” The emerging symptoms were traced and relayed back to the government, who was at the same time coordinating the national citizens’ lockdown plans and seeking to learn about the disease progression. Technology devices designed for telemedicine communication with patients at home were provided in the patients’ rooms. Vital signs, including temperature, heart and saturation rates were monitored by the patients *themselves*, an affordance for engaged citizens to follow national directives, using biosensors with information relayed audio visually to hospital staff. A Lead in Telemedicine, explained
that “the main objective was to provide the highest medical care with minimal physical contact to decrease the risk of staff contamination to afford pandemic control. Technologies for communication, monitoring, and physical examination were specifically chosen by their ease of use, as there was no time to train the patients before they were isolated from the public” (webinar, 15.3.2020).

As a considered national emergency, a monitoring surveillance system was also collaboratively developed with the IDF, to contain the spread of the virus within the hospital. Sheba MC integrated its existing network of about 600 surveillance cameras in public areas across the campus, setting off alarms when someone entered a department without wearing a mask, as a bureaucratic domination of movement. In this digital innovation, the general audio function associated with camera visual was turned off, and instead audio was linked to the digital traces on the screen, namely whether masks were being worn or not. The system, based on a novel configuration of remote technologies, also supported infectious-disease nurses to instantly determine who else needed to be quarantined when a hospital worker tested positive, by assessing video footage. A Director explained, “We can ask the system to show us anyone who was in contact with that person, specifying the distance and duration of contact - for example, closer than two meters for more than five minutes - and it gives us either a list of people or photos.” The violation of public privacy, directed by the Israeli ministry as a national security act, was conceived as a legitimate adjustment of practice to control the pandemic spread and protect medical staff.

**Corporate logic and technology affording the control of hospital operations**

The corporate logic has been characterised as basing its norms in firm employment, following a strategy of increasing the size of a firm and deriving its authority through top management and hierarchy (Thornton et al 2012). Actors who draw on a corporate logic will focus their
attention on using technology for enacting their firm’s standards and maintaining control over organisational operations, as seen by Berente and Yoo (2012) and Butler (2011).

The first wave of COVID-19 patients halted the established flow of patients into hospital beds. The disease presented the hospital with a marked influx of patients requiring respiratory related treatment, and needing ICU beds. All incoming patients had to be screened. Further, COVID-19 patients could infect others including staff, putting the workforce at risk. In response, directors at Sheba MC constructed rapid design solutions to increase the inpatient bed capacity, pointing to their logic of extending corporation size. Their comprehensive telemedicine solution included: medical care for isolated coronavirus inpatients, home hospitalisation for coronavirus patients, and continuity of care for non-coronavirus ambulatory patients. Sheba MC was “fortunate compared to other hospitals due to its large campus and options to create physical separation” (Sheba Architect). The COVID-19 Critical Care unit was erected in an underground parking structure and the COVID-19 Intermediate Care units were located in a converted detached building, interconnected using telemedicine technology. In addition, Sheba MC created an emergency hospital center called the “war room”, to operate hospital level logistics and to overview the performance of all the hospital units, using remote technologies. The ARC Innovation Centre created a specialised dashboard that integrated the digital audio-visual feeds across the hospital to display a comprehensive view of the hospital statistics in real-time, including number of patients by their medical condition, age, gender, location, and Length of Stay (ARC Innovation Dashboard for COVID-19).

Operations were further adjusted to separate coronavirus patients from most of the medical staff. All the COVID-19 units were designed with separation between ‘clean’ and ‘contaminated’ zones, distinguished circulation routes, and a special control room to supervise remotely the operations of the unit. Digital technologies can afford the management
of patients through audiovisual communication between a ‘control room’ in the ‘clean’ zone and the patients and necessary staff in the ‘contaminated’ zone. As stakeholders guided by this logic direct their attention to gaining control, the innovative use of technology affords real-time information that can support workforce and patient safety. “The control room allows the manager to have more data on each patient and to have an overview of the whole unit” (Sheba Director). Using the telemedicine technology in these ways, operational directors of the hospital adjusted their practices as sensitised by the corporate logic of keeping managerial control and authority remotely. This adjustment to their monitoring practices enabled senior management to recover a sense of control over their operations in a time of heightened uncertainty.

**Professional logic and technology affording collaborative quality care**

The professional logic has been characterised as basing its norms in guilds and associations, following a strategy of increasing personal reputation, and deriving its authority through professional expertise (Thornton et al 2012). A key source of identity drawn on by this logic is the quality of one’s craft (e.g. Kohli and Kettering 2004). Thus, stakeholders directed by this logic would be expected to focus their attention on the possibilities for using technology to maintain their expert autonomy and to increase their knowledge, or projecting this knowledgeability to others, as shown by Hultin and Mähring (2014).

The high levels of contagion associated with COVID-19 forced all healthcare staff to wear an armor of Personal Protective Equipment (PPE), creating a physical barrier across the entire face, hands and rest of body. This made it extremely difficult for staff to communicate with patients and with each other, hindering the therapeutic personal contact between staff and their patients. A Service Director commented, “It was the first time we ever thought about how to separate staff from patients… the coronavirus crisis forced everyone to adjust
their practices”. Prior to the pandemic, doctors had argued against the use of telemedicine technologies because their communication could be compromised, and establishing therapeutic relationships hampered. However, in response to COVID-19, the hitherto resistance to using audio-visual technologies in accessing meaningful knowledge about patient care needs, was overruled by the fear of contamination. “The staff were afraid of the patients. This is something we did not have before. We could always get contaminated with diseases, but the coronavirus made it scary… similar to HIV at the beginning” (Medical Lead). Telemedicine technologies were set up to care for patients in the hospital, particularly COVID-19 patients in critical care. These patients required intense monitoring, which was difficult for staff to sustain wearing the stifling PPE. In this new model of care, patients could be monitored by camera from a safe, COVID-19 and mask free, vantage point.

The PPE made it difficult to speak and hear conversations, and innovation in technology use restored a level of collegial collaboration in coordinating expertise and care. The doctors and nurses took up 3 hourly rotations across the ‘clean’ and ‘contaminated’ spaces, to alternate between needing to wear PPE kit during their 12 hour shift. Communication around patient care between the various staff members frequently used audio-visual technologies, with one (unmasked) staff sitting in the ‘clean’ area accessing a monitor screen and their colleague at the patient’s bedside in the ‘contaminated’ area wearing PPE. One resident explained “If you're a specialist supervising a resident who is injecting an infusion in the patient in bed #6 – you want to see if it gets complicated.” He goes on to explain that the specialist could watch through the digital technology to oversee and verbally direct the process from the ‘clean’ room. In this way the technology afforded medics to share their expertise with nearby colleagues without the discomfort of PPE. A medical innovation lead explained, “In the intermediate care units, telemedicine was mainly used to communicate with the patients, and in the ICU it was mainly used to communicate amongst the staff”.
Most of the senior doctors spent less time wearing PPE in the contaminated areas, and focused instead on visiting inpatients virtually using mobile audio-visual technology. Remote monitoring technologies augmented the telemedicine affordances for care, as additional information could be transmitted and integrated into care processes. For example, EarlySense tracking of continuous heart rate and respiration rate through a sensor placed under the mattress of the bed, provided audible smart alerts on possible changes in medical condition, and Tyto Care enabled physicians to visualise physical examination from afar, thereby supporting the coordination of the doctor’s expertise. Adjusting their practices in this way, enabled the doctors to improve rapport with their patients. A head ICU nurse explained, “The patients were able to see a human face on the robot screen without PPE. Patients communicated better with a physician from a distance, for example on the robot screen, than with a physician at their bedside covered with PPE”. Sensitised by the professional logic to build expertise in association with other colleagues, doctors used the telemedicine technologies to recover their ability to communicate with each other, and move across the hospital between patients.

*Family logic and technology affording encouragement and commitment to kin*

The family logic has been characterised as basing its norms in household membership, demonstrates strategies that display enduring commitment to the family, and derives legitimacy through protection of kin generations (Thornton et al 2012, Reay et al 2015; Sirmon et al 2008). Stakeholders following a family logic can be expected to focus their attention on using digital technology to maintain family involvement in the care treatment, encourage the morale of sick family members and protect family interests during grieving and loss (e.g. Heimer 1999).
The COVID-19 pandemic presented a crucial challenge to family as they were suddenly unable to visit their hospitalised relatives, and thus separated from their ill loved ones. In response, practices were adjusted through remote care technologies to enable patients to communicate with family. As a result of family member distress, social workers and other clinicians became involved in setting up telemedicine technology to provide an ‘electronic visiting time’, which replaced actual visiting privileges. “It took time to build trust with the families who were left out. We developed a system for the families to communicate online with the patients from a special room in the hospital ... Although the same technology was provided from home, many families preferred to come to the hospital and communicate from the designated room” (Customer Lead). In addition, the same technologies were used in the intermediate unit between the patients themselves who became a designated community of isolated individuals.

In the ICU, the communication with the patient’s families at home was organised by the unit director, a senior physician, and the unit’s social worker. “This was a significant change as normally the resident physicians communicate with patient’s families, not the unit director and leading physicians” (ICU Lead). “Before the coronavirus pandemic, the patient family was mostly considered as a hazard that interrupts the staff work at the unit, asking constant questions, but now we realised the special role of family members to provide psychological support to the patient” (Customer Lead). “At the beginning of the crisis, families were given a choice to see their loved one before and after death only remotely by video, later we changed the policy and allowed the families to enter the unit with full PPE or to look through a glass window” (ICU Lead). Sensitised by the family logic of making family interests part of the hospital’s processes, visiting practices were adjusted using telemedicine technologies to afford encouragement between patients and family members in difficult times.
DISCUSSION

In times of crisis, practices can change rapidly. Decision makers are pressed to implement technology with little time for planning and coordination (Majchrzak et al. 2007). Our case provides illustrative insight into the role of institutional logics in directing the attention of stakeholders to find diverse action possibilities through digital technology in times of crisis. Sheba MC’s rapid responses to the COVID-19 crisis demonstrate how telemedicine technologies, serving as ‘digital PPE’, were reutilised for diverse purposes, such as surveillance, control of operations, inpatient safety and quality of care, and family support, as guided by the different institutional logics. While the digital innovation literature has highlighted the generativity and flexibility in use of these technologies (Yoo et al. 2010; Zammuto et al. 2007; Barrett et al. 2012; Oborn et al. 2011), we argue that understanding the dominant logic held by a stakeholder group is important in shedding light on how digital innovation emerges in response to a crisis. In so doing, we connect the macro level concept of institutional logics in understanding how technology users’ attention can be directed with the micro level focus of how certain technology affordances might become activated in adjustment practices. We suggest this nexus is particularly important to study during times of crisis because innovation can become accelerated as digital technologies are mobilised for a fast response to support recovery.

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Table 1 synthesises our findings on diverse logics and technology affordances in responding to a pandemic crisis. In so doing, we also summarise and locate these insights within the broader logics and technology affordances literature. Stakeholders with a dominant state logic directing their recovery to the emerging pandemic focused their attention on
affording national pandemic control, with a goal of protecting citizens within the national boundaries. Drawing on their interests of national governance within the healthcare arena, improvised use of telemedicine technologies traced disease progression and the movement of individuals for the purposes of containing the disease. These adjustment practices further informed state level actors on national policy in the crisis response. Stakeholders with a dominant corporate logic focused their attention on affording control of hospital operations. The sudden influx of patients, rapid redeployment of new spaces for hospital beds and new work routines directed their recovery to regain efficiency by integrating real time logistics information with telemedicine technologies. These adjustment practices enabled them to reclaim visibility over their dispersed operations without the need to physically visit contaminated zones. Stakeholders with a dominant professional logic focused their attention on affording collaboration and communication with colleagues, overcoming the interferences of protective barriers. Drawing on their need to coordinate expertise, improvised enactment of telemedicine technology in care delivery enabled them to make use of safe spaces to interact with colleagues and patients from a distance. Their adjustments to the new protective requirements imposed by the pandemic directed their recovery to innovate new ways of sharing expertise and monitoring patient care. Stakeholders with a dominant family logic focused their attention on affording encouragement and commitment to kin. Though family members generally have low levels of authority within health organisations, the sudden disruption of family life drove kin to clamour in support of distressed and isolated loved ones. Noting that patients also responded positively to family involvement, recovery of contact was improvised using telemedicine technology. The digital innovation of electronic visiting hours became an important crisis response to encourage grieving families. In order to enact the new telemedicine affordances, the four stakeholder groups studied often had to be attentive and responsive to the goals and actions of each other, working together on a concerted
organisational wide crisis response. Thus for example, medical professions worked with state actors to afford pandemic control.

Our analysis contributes to scholarship on institutional logics, by connecting the role of logics in shaping digital innovation in a crisis response. Previous literature has shown how logics influence the implementation of new digital technologies (Hultin and Mähring 2014; Slavova and Karanasios 2018), for example by embedding specific logics into the design of the technology (Berente and Yoo 2012). Our study shows how logics are also important in shaping how organisations adjust their practices through the innovative use of existing technology. Given the institutional complexity of organisations (Dunn and Jones 2010), the diverse ways of appropriating technology is influenced by the rationality of meaning systems held by the diverse stakeholder groups. As each stakeholder group has their varied goals and priorities, logics sheds light on how ongoing improvisation in response to changing contexts often results in a diversity of use. While few connections have been made in the literature between institutional logics and crisis, such critical events might be considered as external ‘jolts’ (Hinings and Greenwood 1996) to which organisations need to quickly respond. Such unplanned, emergent responses, we have argued can also account for the diverse stakeholders’ goals and logics which direct their attention in their coping, and often through the innovative use of digital technologies.

Our findings also show the importance of digital innovation in responding to a crisis, and how digital technologies can enable rapid adjustment of practices as organisations work towards recovery. In so doing, we add to the crisis literature which has highlighted the important connection between rapid improvisation and crisis response, though the role of digital technology either been largely absent (c.f. Williams et al. 2017) or has often been relegated to contributing to – or avoiding – the crisis, rather than in helping to respond to it (Williams et al 2017; Vaughan 1996). We show that digital technologies, with their flexibility
and malleable uses, can be important to an organisation’s ability to adjust and recover. Building on Faik et al’s (2020) insights that logics and technology affordances recursively shape the appropriation of digital technology, we specifically highlight how crisis responses vary between stakeholders with different goals as they rapidly engage in their respective adjustment practices. The different technology affordances posited in our findings, were influenced by the emerging needs that the crisis presented, such as the necessity of protecting citizens from the unknown virus threat, or controlling hospital operations when an influx of patients overwhelm the services. The diverse action possibilities of digital affordances enable technologies to be appropriated in new, and innovative ways, helping to counter the unexpected effects of a crisis through inventive grass root responses. Importantly, these different responses can work together when integrated across the organisation so that the crisis responses are coordinated, rather than disjointed, as stakeholders engage in several adjustments in their practices.

CONCLUSIONS

In conclusion, our paper highlights important implications for theory, particularly in the interaction between logics, digital technology and crisis. We add to understanding the role of institutional logics in directing the attention of stakeholders to find diverse action possibilities through digital technology in times of crisis. Understanding the dominant logic held by a stakeholder group is important in shedding light on how digital innovation emerges in response to a crisis. Crisis can redirect goals, and thus connecting the macro level concept of logics to the micro level focus of affordances is particularly poignant in a crisis where urgent responses and new ways of working are required.
In connecting institutional logics to crisis, (where few connections have been made in the literature), we see crisis events, such as a pandemic, as external ‘jolts’ (Hinings and Greenwood 1996) to which organisations need to quickly respond. The unplanned, emergent responses, come from the diverse stakeholders’ logics which direct their coping. And such coping, in the situation we examine, is done through the innovative use of digital technologies. As such, our contributions build on Faik et al’s (2020) recent synthesis of the recursive relationship of logics and technology affordances in shaping digital technology use, to specifically highlight how crisis responses, and need to adapt practices, can be shaped by the affordances enacted through technology use.

Given the many possible trajectories and uses for a digital technology, a practical implication arising from our findings is to encourage decision makers to develop greater awareness and openness to the multiple logics that are important for shaping and influencing the success of their organisation. Such openness might enable greater experimentation towards innovation during crisis by the diverse stakeholders, thereby enhancing the creative potential in solving the emerging problems. In a crisis, where there is little clarity as to what is around the corner, we expect that facilitating such improvisation from a spectrum of stakeholders might enable a breadth of grass-root responses to emerging challenges. For example, in our case, the crisis resulted in problems around governments keeping citizens safe, managers keeping staff safe, staff communicating with each other and family supporting and encouraging sick relatives. Each of these challenges required different affordances of digital technologies connected to various institutional logics to enable innovative practices that support recovery and necessary readjustment.

For management, awareness of the different institutional logics informing innovation processes can support decision-making to become more proactive, rather than reactive, being able to anticipate which stakeholders might more easily apprehend affordances for problems
they prioritise. Further, understanding the tensions and often conflicting objectives of the institutional logics in play can help decision-makers grasp the complexity and the dynamic nature of crises, as well as the necessary trade-offs between stakeholders.

Future research might examine in what ways the coexistence of multiple institutional logics may enable (or constrain) recovery in a time of crisis. For example, some logics might compete more readily with each other, while other combinations may lead to hybridisation or integration of responses. These challenges might be particularly important to study in cases or contexts that go beyond single organisations, for example in crises related to war or natural disasters, where considerable complexity and diversity of logics are prevalent amongst the stakeholders concerned. Further, how the malleability of technology affordances might support innovation and rapid change across diverse, and often conflicting stakeholders’ objectives during crisis is an important area for research.

A related research question that arises from our findings is to further examine the role of digital innovation in sustaining organisational responses to crises over the longer term and how these might be enabled through a culture of innovation both within the organisation and across a wider range of stakeholders embodying a complex array of institutional logics. In the aftermath of a crisis, organisations and stakeholders may need to recalibrate to a ‘new normal’ and balance their return to pre-crisis routines where warranted, but remain savvy in appropriating the benefits learnt from the innovative ways of organising and working.

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<td>Broadening the range of actions that can be traced by state institutions (Davidson &amp; Chisman 2007; Faik et al 2020)</td>
<td>Affording national pandemic control</td>
<td></td>
</tr>
<tr>
<td>Corporation</td>
<td>Firm employment</td>
<td>Top management and hierarchy</td>
<td>Increasing the size of a firm</td>
<td>Bureaucratic efficiency and control (Scott et al 2000; Reay &amp; Hinings 2009)</td>
<td>Enacting firm’s standards and maintaining control over operations (Berente &amp; Yoo 2012; Butler 2011; Faik et al 2020)</td>
<td>Affording the control of hospital operations through real time information</td>
<td></td>
</tr>
<tr>
<td>Profession</td>
<td>Guilds and associations</td>
<td>Professional expertise</td>
<td>Increasing personal reputation</td>
<td>Expertise and collegial association (Scott et al 2000; Reay &amp; Hinings 2009; Hultin &amp; Mähring 2014; Kohli &amp; Kettering 2004)</td>
<td>Maintain autonomy and increase knowledge, or projecting this knowledgeability to others (Hultin &amp; Mähring 2014; Faik et al 2020)</td>
<td>Affording collaborative care, recovering collegial and patient communication</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>Household membership</td>
<td>Family headship (Thornton et al 2012, Reay et al 2015; Sirmon et al 2008)</td>
<td>Displaying enduring commitment to the family</td>
<td>Loyalty and honour of kin (Heimer 1999; Dunn &amp; Jones 2010)</td>
<td>Maintain family involvement in the care treatment, and encourage the morale of family members (Heimer 1999)</td>
<td>Affording encouragement and commitment to kin</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Logics and Technology Affordances in Pandemic Response