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The development of digital workplaces within community-based emergency services

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ABSTRACT

The digital workplace is an organizational asset that enhances employee experience, drives value for organizations, and is a critical component desired for digital transformation. While extant literature on digital workplaces and transformation is plentiful, their interaction regarding digital workplace design levers at a micro level remains largely unexplored. In this research, we adopt digital workplace design levers from the literature and apply that to the world's largest firefighting agency to understand how the agency redesigned its workplace to generate value for emergency services. The design levers identified in this study were physical space, IT systems, symbols, managerial focus, social media, and systemic learning. Embraced by coercive, normative, and mimetic institutional elements, deinstitutionalization in emergency services was examined through the lens of Institutional Theory. We recommend three strategies that generate value for emergency management agencies engaged in digital workplace transformation.

Introduction

Technological disruptions have influenced individuals' private lives and extended into their workplaces (Mettler, 2024). The digital workplace is a priority for organizations due to its wider implications for the employee experience (Berger et al., 2024; Zimmer et al., 2023). The main characteristics of the digital workplace are organizational strategy and its design, people and their work, and technology platforms (Baptista et al., 2020; Kurian et al., 2021, 2024). Some implications for digital workplaces are relationship building among employees (John et al., 2024), employee training for technological communication choices (Cameron & Webster, 2013), task enhancement for employee responsibility skills (Maruping & Magni, 2015), and leadership skills for administrators (Huy & Shipilov, 2012). In the digital workplace, employees must adhere to compliance behavior and organizations must reward employees based on the organizations' strategy (Chen et al., 2012). Thus, digital workplaces intertwined with physical spaces, systems, and culture are an asset for organizations that improve employee productivity and satisfaction.

Digital workplaces are crucial for workplace transformations (de Moraes et al., 2024). Workplace technologies are important in digital transformation (Rossi et al., 2020) and individuals must be provided with the knowledge to use these technologies responsibly (Reddy et al., 2022). Additionally, digital transformations are necessary for organizations and have considerably changed businesses operations (Kraus et al., 2022), including changes to industry standards (Scott & Orlikowski, 2021). Education and training are essential for digital transformations and can take place at organization and intra-organizational levels. Comparatively, digital transformations lead to technostress, overload, anxiety, and addiction for employees that result in cognitive (e.g., burnout) and behavioral outcomes (e.g., organizational commitment) (Berger et al., 2024; Marsh et al., 2022). New competence requirements for digital transformation have led to asymmetrical power relations in organizations, which were resolved by embracing togetherness among stakeholders (Hallin et al., 2022).

Based on an extant literature review, Trenerry et al. (2021) developed a multi-level framework that proposed individual (e.g., technology acceptance and adoption), group (e.g., team communication and collaboration) and organizational factors (e.g., leadership) (Müller et al., 2024) which are desired for digital

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transformation. However, their framework on digital transformation had limited focus on the antecedents of communication and behavioral norms required at workplaces. Thus, focusing on the design levers that facilitate digital and physical communication and drive behavioral norms for digital workplaces is the first step in addressing this research gap. A few studies have examined technologies and people's influence (Müller et al., 2024) on digital transformation at a macro level. Still, limited attention has been paid to how they are related to digital workplace dimensions in community-based emergency services. Identifying the design levers desired for employee connectedness through digital and physical communication will address the second research gap. Other studies on digital transformation indicate that physical spaces drive employee engagement (Papagiannidis et al., 2020) and digital technologies drive positive and negative outcomes for organizations (Huang, 2024; Meske & Junglas, 2021); however, these studies were limited in identifying the design levers and the communication and behavioral norms desired for digital workplaces. Hence, adopting an integrated framework to identify digital workplace dimensions and the design levers desired for digital workplaces in community-based emergency services will address the third research gap. Additionally, organizational structure (Oludapo et al., 2024) influences digital transformation and some work practices could be permanently abandoned in the digital transformation context (Zimmer et al., 2023). These studies have limited focus on the behavioral norms required for digital workplaces. Hence, the fourth research gap is the need to identify leadership skills desired for digital workplaces. In a recent review, while the benefits and challenges of digital transformation were examined, the discussion on the dimensions of digital workplaces was sparse (Liu & Zowghi, 2022). Studies on digital transformation have given limited attention on organizational change, especially in emergency management (Hanelt et al., 2021; Kurian et al., 2021, 2024). Furthermore, literature is sparse on how community-based emergency services are pressured to change taking into consideration the coercive, normative, and mimetic dimensions of Institutional Theory (Schiavi et al., 2024). The overarching research objective is thus to examine the dimensions of digital workplaces, and their design levers desired for digital transformation in emergency services since digital workplaces support both commercial and noncommercial purposes (Omol, 2024).

Literature review

This section defines the digital workplace, outlines its key dimensions and design levers essential for workplace transformation, and identifies the research gaps. It concludes with the research questions that this study aims to address.

The digital workplace, which entails the physical space, technology, and people, is a key strategic management tool that facilitate organizations' digital transformation (Baumgartner et al., 2021; Zimmer et al., 2023). Digital workplaces not only facilitate the transformation of traditional working environment (Richter et al., 2018) but also address the needs of the Future of Work (Kingma, 2019). Hence, organizations must embark upon redesigning their workplaces. To reap the benefits of digital transformation, organizations in the banking and financial services (e.g., DBS), professional services (e.g., Deloitte), and auto manufacturing industry (e.g., AUDI) have successfully adopted digital workplaces (Dery et al., 2017; Zimmer et al., 2023). Additionally, the digital transformation strategies in nonprofit organizations are not yet matured (Cipriano & Za, 2023). However, literature is sparse on how community-based emergency services (e.g., Rural Fire Services) redesign their workplaces and the value (benefits) they can provide.

The physical space includes all the assets that facilitate the productivity of employees in organizations. Examples of physical spaces in organizations are group or open offices (Baumgartner et al., 2021; Zimmer et al., 2023). The technology component in digital workplaces refers to the information systems employees use to efficiently accomplish their tasks (Cipriano & Za, 2023; Kissmer et al., 2018). A conferencing system is an example of a technology that enhances seamless communication among employees. The people component of digital workplaces represents the behavioral norms required to work effectively in a digital environment (de Kok, 2016), such as leadership skills demonstrated by employees (Dery et al., 2017).

The digital workplace is an organizational asset that improves employee experience and supports digital innovation (Dery et al., 2017; Zimmer et al., 2023). It is also desired for employee productivity (Köffer, 2015). Literature indicates that digital workplaces entail benefits (positive value) and challenges (negative value) to organizations (Omol, 2024). Some benefits are facilitating employee collaboration and mobility, whereas challenges are lack of compliance, stress, and information overload for employees (Köffer, 2015).

Concerning collaboration, it was suggested that organization management is required to build relationship among collaboration tool users (Kugler, Smolnik and Kane, 2015). Additionally, training on how to use communication tools will reduce stress and information overload associated with unnecessary communication (Cameron & Webster, 2013). Another drawback is users' lack of awareness of IT security policies in organizations which reflect compliance aspects (Boss et al., 2009). Concerning mobility in organizations, an adequate balance between tasks and the system used will enhance employee productivity (Harris et al., 2012). A work culture that values helping others can significantly reduce stress and information overload (Dery & MacCormick, 2012). Thus, it is evident that digital workplaces benefit both organizations and their employees.

By examining digital workplace transformation cases in the banking, professional services, and auto manufacturing industry, Dery et al. (2017) identified employee connectedness and responsive leadership as the dimensions of the digital workplace. Employee connectedness was embraced in the communication through physical space, IT systems, and social media. The physical space allowed employees to attend open meetings and trainings that promoted collaborative designs. IT systems promoted collaboration among employees leading to an increase in employee productivity. Social media helped employees to share information and connect seamlessly with senior management. Comparatively, responsive leadership was embraced in the behavioral norms through managerial focus, systemic learning, and brands and symbols. Managerial commitment to improving employee experience through dedicated channels reflects focus. Additionally, organizations were bound to adopt an inclusive management structure with leaders from different divisions. Systemic learning was represented through sharing successful work experiences in the digital era, receiving recommendations and training employees. The brands and symbols represent workplace strategies for implementing change in the organization, including employee empowerment, seamless communication across management hierarchies, and repositioning organizational culture. Limited attention has been given to the effects of new workplace technologies, work practices, leadership styles (Baptista et al., 2020) and learning systems (Lyytinen et al., 2021) prevalent in digital work.

Furthermore, evidence indicates that ergonomic workplace design, particularly through optimized office layouts, enhances employee productivity, strengthens morale, and reduces stress (Shaari et al., 2022). Research also shows that physical ergonomics (e.g., workplace layout), cognitive ergonomics (e.g., software usability or mental workload), organizational ergonomics (e.g., workflow design), and environmental ergonomics (e.g., air quality and lighting) collectively foster employees' physical and social wellbeing (Gasheya et al., 2024; Karmacharya et al., 2025). As in other organizational contexts, ergonomic workplace design plays an essential role in volunteer-supported environments as well (Kim et al., 2025). Organizational design such as the physical arrangement of resources and the task environment were also found to significantly impact the operational performance of emergency service organizations (Duray et al., 2025). Emphasising ergonomic design is critical because workplace injuries are a major contributor to musculoskeletal disorders, which significantly affect workers' health and productivity (Liu et al., 2023). Traditional ergonomic assessment methods, such as the Rapid Upper Limb Assessment (RULA) and Rapid Entire Body Assessment (REBA), have been widely used; however, they fail to capture the dynamic and complex movements of workers (Muharam & Puspasari, 2024). This limitation can be addressed through computational biomechanics tools (e.g., digital human modeling), which provide more accurate and proactive ergonomic analyses (Vujica-Herzog et al., 2022). Recent work also recommends the development of open-source platforms and AI-driven simulations to reduce the cost burden associated with computational biomechanics tools and, in turn, enhance employee productivity (Azodo, 2026).

A review of the literature on digital workplaces and digital transformation indicates that existing studies (Cipriano & Za, 2023; Zimmer et al., 2023) lack focus on the communication and behavioral norms desired for digital transformation at a micro level (i.e., systems, physical space, leadership skills, ergonomics, and change management). Additionally, how the digital workplace design levers establish connection to the digital workplace dimensions is yet to be explored in the literature on community-based emergency services. Moreover, the work done on digital transformation in commercial organizations is not entirely transferable to community-based emergency services since their governing structure is built on volunteers and their contribution (Liu et al., 2021). The scope of the study is limited to community-based emergency services, where the majority of the workforce consists of volunteers, a characteristic that is unique to the NSW-RF. Although some studies have examined digital

transformation (Cipriano & Za, 2023; Liu & Zowghi, 2022; Trenerry et al., 2021; Zimmer et al., 2023), studies that delve into digital workplace dimensions and design levers in community-based emergency services are sparse.

To address these gaps in literature, this study will thematically analyze bulletins published by the New South Wales – Rural Fire Services (NSW-RFS) to identify digital workplace dimensions (i.e., employee connectedness and responsive leadership) and associated design levers (i.e., systems, physical space, leadership skills, and change management) that are desired for digital transformation. Emergency services administrators can use this approach to identify factors essential for digital transformation in their organizations. To the best of our knowledge, this is the first study examining the six design levers of digital workplaces to add a micro perspective to the literature on digital workplaces that drives digital transformation in community-based emergency services. Studies on digital workplaces conducted on commercial organizations and digital workplace factors essential for digital transformation at the individual, group, and organizational level in community-based emergency services are sparse. Emergency services administrators embarking on digital transformation projects could consider the individual, group, and organizational factors in their digital transformation strategy for a successful implementation. Thus, the research questions that this study aims to address are:

- **RQ1**: What are the overarching themes on digital workplace dimensions and design levers found in a community-based emergency service?
- **RQ2**: How did digital workplaces generate value for emergency services?

Theoretical framework

Institutional Theory explains how organizations adopt practices due to social pressures prevalent in the environment rather than economic benefits (Scott, 2001). Institutional Theory has been applied to understand how institutional pressures drive organizational changes, thereby enabling digital transformation through coercive, mimetic, and normative processes (Schiavi et al., 2024). The theory can be used to conceptualize the importance of institutional elements to organizations and their actions to accomplish organizational goals (Teo et al., 2003). Organizations are keen on transforming their traditional workplaces into digital workplaces to improve organizational effectiveness (Colbert et al., 2016; Kaarst-Brown et al., 2018). This change enhances employee experience and performance (Zimmer et al., 2023). Institutionalised activities are established practices in organizations and are reproduced at workplaces (Greenwood & Hinings, 1996; Scott, 2001). These practices change or are discontinued over time and defined as deinstitutionalization (Oliver, 1992). According to Mignerat and Rivard (2009), institutional pressures can cause the de-legitimization of established organizational practices which triggers organizational changes. Comparatively, it was also evident that digital workplace transformations face several organizational challenges (Vial, 2019) leading to the deinstitutionalization of established organizational practices (Zimmer et al., 2023).

The three institutional elements proposed by Institutional Theory are coercive, normative, and mimetic pressures (Nurunnabi, 2015; Teo et al., 2003). The coercive pressure includes rules and regulations exercised by external entities on organizations to ensure that they exhibit an accepted behavior. The normative pressure reflects the social norms adopted in an organization. The mimetic pressure reflects the best practices adopted by organizations (e.g. what peers do) to be successful in their field. It was also found that coercive and normative pressures were materialized through relations, while mimetic pressures were established through equivalence across organizations (Teo et al., 2003).

In this study, we examine digital workplace design levers crucial for digital workplace transformations that may cause changes to established organizational practices. Institutional Theory can examine how new organizational practices established through digital transformation receive social acceptance from stakeholders (Hinings et al., 2018). Organisations adhere to institutional elements since deviating from them results in a lack of social support; hence, it is crucial for community-based emergency services because volunteers comprise the primary workforce.

Institutional Theory can also be applied at the individual, team, and organizational level (Li et al., 2021), which aligns with the factors recommended for digital transformation (Trenerry et al., 2021). Hence,

Institutional Theory is a suitable theory to examine changes to established organizational practices in community-based emergency services and to uncover the factors that drive deinstitutionalization with respect to digital workplace design levers and institutional elements. To establish the application of Institutional Theory in the digital transformation of community-based emergency services, the themes generated in this study will be mapped to the elements (i.e., coercive, normative, and mimetic pressures) of Institutional Theory.

Methodology

A case study is a suitable methodology to generate an in-depth understanding of a single phenomenon in an organization's natural context (Palvia et al., 2003). Hence, it is used in this qualitative research to understand the multifaceted dimensions of digital workplaces and how they generate value for emergency services.

The organization selected for this study is the New South Wales – Rural Fire Services (NSW-RFS), as it is the world's largest volunteer-based firefighting agency. The agency was established in 1900 and currently has 75,354 volunteers (Fast-Facts, NSW-RFS, n.d.). Only 1% of its personnel are full-time employees, who support 110 local government areas in NSW. The extent of incidents (22,000 in 2020/21) attended by the volunteers of NSW-RFS makes it a suitable choice for this study and for other emergency services to adopt this study's findings. The supplementary data which indicates the number of fire incidents managed by the NSW-RFS is available at the Australian Research Data commons (ARDC, 2013).

To analyze qualitative data collected from the two bulletins published by the NSW-RFS in 2020, thematic analysis (Braun & Clarke, 2006) was used. The bulletins published immediately after the start of the pandemic were selected to understand the extent of digital transformation embraced by the NSW-RFS to generate value from workplace dimensions and design levers. The content in the bulletin included text and images with description, which was used for thematic analysis. The first bulletin had 60 pages and the second bulletin had 56 pages of content in English. To use the bulletins for this research, the communication services division of NSW-RFS was contacted, and consent was received before the start of the thematic analysis. The bulletins were coded manually and coding consensus among the two coders were measured using the inter-rater reliability scores (Table 2).

Previous research has used thematic analysis to analyze data and generate themes in emergency management (Kurian et al., 2021). The thematic analysis method could identify, analyze, and interpret meaning and generate themes from the collected data to address the research questions. The six steps of thematic analysis were followed (Braun & Clarke, 2006). A flowchart which describes the thematic analysis is illustrated below in Table 1.

In step 1, familiarity with data was established by reading the two bulletins. In step 2, a deductive approach was used to code the content based on the dimensions of digital workplaces (Dery et al., 2017). The codebook adopted for this study and inter-rater reliability (McHugh, 2012) among the two coders with domain expertise in digital workplace transformation and emergency services are provided in Table 2. In Step 3, themes were generated based on associated content. In Step 4, the generated themes were reviewed; and in step 5, the themes were finalized by removing those without enough support from the data. In Step 6, the analysis concluded with reporting the themes.

Results

The thematic analysis identified six themes which are presented in Figure 1 and discussed below.

Table 1. Flowchart of thematic analysis.

Step 1	Download and read the NSW-RFS bulletins
Step 2	Manually code the content using a deductive approach
Step 3	Generate themes from the coded content
Step 4	Review the generated themes
Step 5	Remove themes that does not have enough support
Step 6	Document the themes

Table 2. Codebook.

Code	Definition	Example	Inter-rater reliability
Physical Space	Office spaces as a foundation for introducing new technologies and business practices Baptista et al., (2020); Dery et al., (2017)	*"The design of the room is specifically engineered to enhance inter-agency cooperation and allow information to flow easily and quickly to the centre of the room in a crisis" (Bulletin 2/2020)*	98%
IT Systems	Technologies to support open and flexible workplaces Baptista et al., (2020); Dery et al., (2017)	*"With more than 70,000 members and nearly 2,000 brigades, we know that a common system for members to signal their availability to attend an incident, be called upon to attend an incident and accept the call to attend would be of great benefit" (Bulletin 2/2020)*	98%
Social Media	A medium to shift communications from email and voicemail for sharing ideas and experiences Baptista et al., 2020; Dery et al., (2017)	*"These maps became known as 'red maps' and were shared on Facebook, Twitter and the NSW RFS website in an effort to pre-emptively and visually communicate the risk posed by the predicted fire runs" (Bulletin 1/2020)*	95%
Managerial Focus	Senior Management's emphasis on improving the experience of volunteers and the public Baptista et al., 2020; Dery et al., (2017)	*"These priorities focus on the things that will make a real difference to our members – so they can operate safely and effectively, and connect and work together to best serve the community" (Bulletin 2/2020)*	92%
Systemic Learning	Training for all levels on new ways of working Dery et al., 2017; Lyytinen et al., (2021)	*"A very simple tool, the Grain Harvesting Guide enables farmers to measure their local weather conditions and determine if they should continue or delay harvesting operations due to fire risks" (Bulletin 2/2020)*	97%
Symbols	Workplace strategy in an organisation Baptista et al., 2020; Dery et al., (2017)	*"From our perspective, the State Operations Centre can't do what it does without all of our people in the field, and all the people in our IMTs and in our brigades doing what they do" (Bulletin 1/2020)*	89%

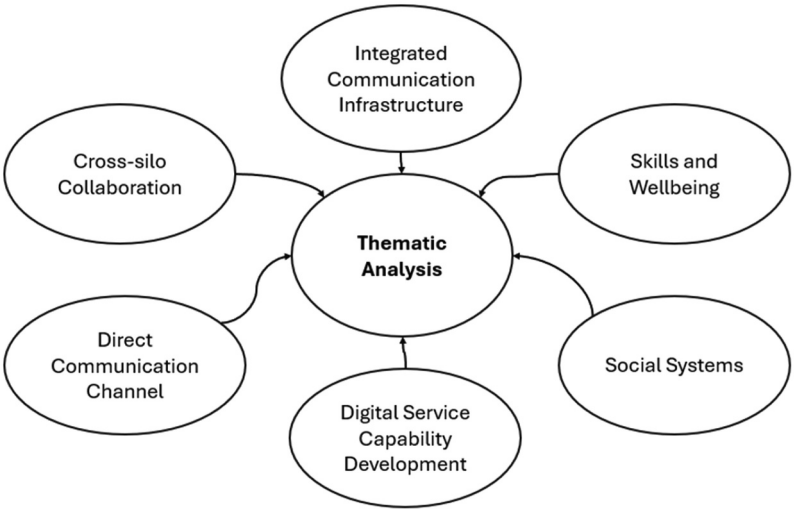

Figure 1. Findings of thematic analysis.

Theme 1 - Cross-Silo Collaboration

Cross-Silo Collaboration means breaking down isolated teams and encouraging communication and collaboration across teams using physical spaces. One of the primary spaces used by the NSW-RFS to manage and coordinate state-wide bushfire incidents was the State Operations Centre (SOC). The SOC was instrumental in timely forecasting and allocating resources (e.g., strike teams and aviation assets) since the SOC's physical space could accommodate hundreds of personnel from RFS and other emergency services agencies. An example quote is – "*Capable of accommodating over 200 personnel, during the 2019/20 fire season this worldclass facility was home to a never-ending rotation of staff from the NSW RFS as well as interstate and international firefighting organisations, government agencies and other emergency services.*"

The circular design of the SOC enabled a controller to be at the center of facility, which provided instant access to the representatives of agencies supporting state-wide incidents. The design enabled the information to flow seamlessly across agencies and the controller for efficient decision-making. An example quote

Figure 2. SOC (adopted from the Bulletin No 1, 2020).

is – "*You can't arbitrarily stand in the middle of the room and direct what has to happen, you have to do it in collaboration. There is a time to be direct, but there's a time to work closely with people as well. And the majority of the time it is a collaborative approach in partnership with the MICs and the other agencies.*"

In addition to the use of SOC during fire incidents, it was used during the COVID-19 pandemic as a State Health Emergency Operations Center. During the pandemic, SOC was used by government agencies, including the Health Department, police force, and Australian Defence Force. The SOC and the media facilitated interactions between government agencies, establishing long-term relationships between agency members. An example quotation is – "*Having the ability to walk across the room and talk to people about an issue not only helps to get things done more efficiently, but it also builds relationships between the agencies that need to work together during these times; The 2019/20 fire season highlighted the value of the Centre as a space that could easily house hundreds of staff from multiple agencies, enable these staff to coordinate an emergency response and also function as a meeting point for government and media; I think once we're on the other side of this thing, it would be nice to think those relationships will exist well beyond COVID-19.*" Thus, the physical space at NSW-RFS provided an avenue for Cross-Silo Collaboration among stakeholders in community-based emergency services and established long-term relationship across agencies. The above discussion reflects the design lever, Space, which focuses on the communication aspect of employee connectedness at workplaces for digital transformation. Another example that highlights the ergonomic design aspect of the SOC is – "The design of the room is specifically engineered to enhance the inter-agency cooperation and allow information to flow easily and quickly to the centre of the room in a crisis." An example of Cross-Silo Collaboration in the SOC is illustrated below in Figure 2. The figure, taken prior to the implementation of COVID-19 restrictions, illustrates how the SOC fosters communication and collaboration across emergency management teams.

Theme 2 - Integrated Communication Infrastructure

An Integrated Communication Infrastructure is defined as a facility through which the stakeholders of an organization can share information across disparate systems. The systems at NSW-RFS played a significant role in supporting the volunteers to protect and mitigate the impact of fires on communities and the environment. The main objective of the integrated systems was to communicate the availability of volunteers for incidents, receive detailed information about incidents, generate routing information to reach the location of incidents, and create incident reports for archiving. An example quotation is –

"*Members will be able to jump in a vehicle and use a mounted MDT device to display the job they are attending, and they will have access to road and routing information. Information from the member availability and response system will show members allocated to attend, and job information in the system will automatically populate for completion of brigade incident reporting.*"

Predictive systems helped to forecast the spread of fires and provided confidence in the maps generated by analysts. Before undertaking prescribed burns, predictive services helped to decide on optimum burn windows and inform communities about the impact of smoke concerning its direction and density. An example quotation is – "*One notable achievement during the 2019/20 fire season was the creation and public release of Fire Spread Prediction Maps for the very first time in NSW*." Another technology that supported volunteers on the ground was the forward-looking infra-red cameras which spotted remote bushfires and assisted with missing person searches. An example quotation is – "*The FLIR camera will also be able to detect thermal signatures of missing persons in certain environments, enabling detection and rescue*." Thus, the Integrated Communication Infrastructure reduced the administrative burden and provided system efficiencies that helped incident management teams to allocate resources efficiently during critical incidents. The above discussion reflects the design lever, System, which focuses on the communication aspect of employee connectedness at workplaces for digital transformation.

Theme 3 - skills and wellbeing

The NSW-RFS management admired the skills of local volunteers as their knowledge was important for the incident management teams in allocating resources for fire mitigation. An example quotation is – "*I'm sure that if we didn't have these experienced local people in IMTs, the losses would ultimately be much worse*." Exclusive photographs of volunteers containing fires on the ground and their efforts in successfully saving properties and lives during intense firefighting were disseminated through an online bulletin. The online bulletin demonstrated the skills and dedication of volunteers and was digitally archived in a national library for future references. An example quotation is – "*The general public will never see where I get to go and what I get to do, but hopefully the images I capture can give them an insight into the brave men and women who put on the NSW RFS uniform*."

NSW-RFS also demonstrated a keen interest in the wellbeing of the public and its volunteers by emphasizing the use of technology to reduce social isolation. An example quotation is – "*Connect by giving someone a call, having technology-free time with your family, bringing out old board games or using FaceTime with friends*." Another instance was the collaborative development of policies on the use of technology to model the spread of smoke from fires, as it impacted the health and well-being of vulnerable people. An example quotation is – "*Current guidelines released from State Operations require all burns greater than 50 ha within the state to be modelled and all burns greater than 10 ha which may have an impact on the Sydney basin to be modelled. This is to assess risk to vulnerable communities*." Additionally, remote communication technology was used to organize large events instead of face-to-face meetings to protect volunteers' health during the pandemic. The above discussion reflects workplace strategy and a design lever of responsive leadership that focuses on behavioral norms required for a successful digital transformation.

Theme 4 - Direct Communication Channel

The management of NSW-RFS organized a monthly broadcast, which included a live Q&A session where volunteers could ask senior staff members questions. Several topics were discussed, which included new technologies being rolled out, training and recruitment in brigades, and promoting community engagement. The success of these online sessions was evident by the attendance of many volunteers across the state. The sessions were archived for future reference. Other valuable resources were shared, including tips on remote working, and the health and wellbeing of volunteers, their families and those connected to them in communities. An example is – "*Guests for the live Q&A sessions have included Commissioner xxx and Assistant Commissioners xxx, xxx, and xxx*."

Through an online survey, the management received feedback from volunteers on how to allocate funding for the completion of critical projects and other agency initiatives. An example quotation is – "*More than 1,600 submissions were received, with the majority being from rural*

brigades." In another instance, online interviews were organized for a research project to receive feedback from communities affected by bushfires. To address future challenges, the management was keen on implementing strategies to enhance the agency's service delivery by reducing unnecessary processes. An example is – "*Our seven Area Commands have now come online and are working with districts on implementing new ways of working to ensure our brigades and volunteers get the support they need*." The above discussion indicates that the management is focused on flattening the organizational structure by providing a channel for volunteers to communicate directly with the management. This reflects managerial focus, a design lever of responsive leadership required for digital transformation.

Theme 5 - social systems

Only some evidence of social media sites and online portals were found in the dataset. The digital maps that predicated the spread of fires were shared on social networking sites (i.e., Facebook) and microblogging sites (i.e., Twitter) in addition to the NSW-RFS's official website. This initiative helped the public understand the risk and receive information about the potential spread of fires. An example quotation is – "*These maps became known as 'red maps' and were shared on Facebook, Twitter and the NSW RFS website in an effort to pre-emptively and visually communicate the risk posed by the predicted fire runs*." Online portals supported volunteers by getting connected, keeping up-to-date with information and receiving health and wellbeing advice. Online portals replaced the existing prescribed burn notification processes done through local websites. This facilitated the automatic communication of information on prescribed burns to other agencies. The above discussion indicates that social systems provide a channel for communication among volunteers and other agencies, which is a design lever of Employee Connectedness required for digital transformation.

Theme 6 - Digital Service Capability Development

Only limited evidence was found on developing digital service capabilities for grain harvesting and fire safety. NSW-RFS developed a grain harvesting guide in collaboration with farmers and harvesters. A digital version of this guide was accessible online to determine the recommended wind speed based on current temperature and humidity for safe harvesting. An example quotation is – "*A very simple tool, the Grain Harvesting Guide enables farmers to measure their local weather conditions and determine if they should continue or delay harvesting operations due to fire risks*." The digital capability indicates that NSW-RFS is keen on developing and sharing information that would empower farmers to make informed decisions while harvesting. Collaboratively developing, sharing, and promoting organization-led digital initiatives for widespread adoption reflects systemic learning, which is a design lever of responsive leadership that focuses on behavioral norms required for digital transformation.

Discussion

This section discusses how the six themes (i.e., Cross-Silo Collaboration, Integrated Communication Infrastructure, Skills and Wellbeing, Direct Communication Channel, Social Systems, and Digital Service Capability Development) represent the Mimetic, Normative, and Coercive pressures of Institutional Theory Elements. The themes and Institutional Theory elements are illustrated in Table 3 to guide the discussion.

The primary workplace design lever desired for digital transformation in a community-based emergency service is the physical space discussed under Cross-Silo Collaboration. The SOC design enabled seamless information flow and efficient decision-making during fire incidents and the COVID-19 pandemic. To ensure ergonomical (physical and organizational) design, the SOC had three concentric circles i.e. center circle, middle circle and the outer circle. The center circle had state level officers, the middle circle had four regional major incident coordination teams, and the outer circle included representatives from various agencies (e.g., water supply, electricity etc). This design helped the seamless flow of information into the center circle and decisions out to the concentric circles around the center circle. A knowledge wall that was visible to everyone in the SOC provided an overview of all on-going incidents. This provided information

Table 3. Mapping digital workplace themes to Institutional Theory elements.

Digital Workplace Themes in Community-based Emergency Services	Institutional Theory Elements
Cross-silo Collaboration	Mimetic Pressure
Integrated Communication Infrastructure	
Skills and Wellbeing	Normative Pressure
Direct Communication Channel	
Social Systems	
Digital Service Capability Development	Coercive pressure

about weather, fire activities, warnings and alerts for the whole state including information from agency's helicopter cameras and social media sites. During COVID-19, along with state's emergency operations, the SOC hosted the state health department's COVID-19 response for six months which facilitated meeting with the Government cabinet and senior officials (NSW RFS Annual Report [NSW], 2020/21). The SOC was again used by the State Emergency Services for 45 days for operational response to the state's flood situation (NSW RFS Annual Report [NSW], 2021/22). The design of the SOC facilitated Cross-Silo collaboration among domestic and international agencies, which led to establishing long-term relationships across agencies. This finding is in consensus with the study of McNaught et al. (2024) where collaboration and partnerships among stakeholders were critical in handling natural disasters. Stakeholders anticipated that such relationships would persist beyond the current pandemic and hence future incidents could be easily tackled together. Critical information was communicated to the media attending the briefings at SOC. Hence, it is anticipated that frequent sharing of information with the media and other agencies in the SOC would ensure that the spread of misinformation during emergencies could be mitigated. Establishing long-term relationship among agencies and providing media briefings at the SOC are evident in the theme. Thus, the timely and verifiable information from the SOC, which could limit the spread of misinformation, agrees with the study of Torpan et al. (2021) on centralized management of fake information. For leadership, administrators of other emergency services could promote Cross-Silo Collaboration in their agencies for long-term benefits, which agrees with Casciaro et al. (2019) on cross-functional management, resource sharing (Song et al., 2025) and coordination (Kapucu et al., 2024) in disaster management. Thus, the value generated by well-designed physical workspaces for emergency services is Cross-Silo Collaboration, which establishes long-term relationships across domestic and international agencies for future incident management and limits the spread of misinformation during critical incidents. Based on the above implications for emergency agencies, physical space, which is an asset for organizations, is classified as an organizational factor desired for digital transformation. This addresses the first research gap by identifying one of the design levers desired for employee connectedness in community-based emergency services. With respect to Institutional Theory, the redesigned workspace supports deinstitutionalization by enabling face-to-face communication across stakeholders of emergency services. To be successful in community-based emergency services and generate value, agencies should promote collaboration and build relationships across stakeholders. With respect to change management, the transition into SOC was scheduled via a stagged approach to minimize the risk on on-going operational activities with the state operations being the last section to relocate (NSW RFS Annual Report [NSW], 2018/19). The organizational structure has been revised for improved governance and the SOC has been included under Field Operations, along with area operations and operations support (NSW RFS Annual Report [NSW], 2023/24). In addition, the SOC supports the agency's sustainability objectives, i.e. 5-star Energy, 4-star Water, and 5-star Green Star ratings. These initiatives involve adopting best practices in emergency services and align with the mimetic pressure of Institutional Theory.

The second workplace design lever desired for digital transformation in a community-based emergency service is IT systems discussed under Integrated Communication Infrastructure. The systems ensured resilient communication and automated reporting, which concur with a study on designing new workplace technologies for efficient disaster response (Kagai et al., 2024; Stute et al., 2020). The Integrated Communication Infrastructure at NSW-RFS provided a consistent and coherent digital communication experience for volunteers, aligning with the employee connectedness of digital workplaces. The Integrated Communication Infrastructure is anticipated to enable the free flow of information that will drive automated interoperability between agencies for a successful digital transformation in community-based emergency services. For example, the mobile data terminals which are in-vehicle

mounted touch screens provide two-way real time sharing of operational information between the members on the field and the communications center (NSW, 2023/24). Another component of the communication infrastructure is the mapping software which helped the members on the field to annotate on the maps directly, integrate that with real-time incident information, and share that information with others in the communication center. The implementation of a new electronic fire danger rating system helped to remotely update the fire danger ratings reducing the manual process. This facilitated situational awareness, improved accuracy and enhanced the operational discussion making process. Another initiative was the standardized rollout of station connectivity software across the agency which alleviated individual units to meet the costs of these services. Furthermore, based on AI and machine learning capabilities, incorporating a bushfire intelligence tool that can predict fire behavior is the focus for the year ahead which could be a great asset to the existing communication infrastructure (NSW, 2023/24). Another example of IT systems that facilitated communication was the launch of "push to talk" units which connected standard service radios to the communication unit in the volunteer helmet (NSW, 2023/24). Other agencies can evaluate the alignment of their communication infrastructure with this integrated approach to enable collective value for agencies working in the emergency services field and reap the long-term benefits of digital transformation. Based on the above implications, IT Systems that are an organizational asset are classified as an organizational factor desired for digital transformation. This addresses the second research gap by identifying a second design lever desired for employee connectedness in community-based emergency services. With respect to Institutional Theory, the redesigned digital infrastructure will support deinstitutionalization by enabling unified communication across stakeholders of emergency services. The agency's strategy to implement Integrated Communication Infrastructure reflects another best practice in emergency services and aligns with the mimetic pressure of Institutional Theory. The mimetic dimension of the Institutional Theory has influenced the agency to adopt – "Research, Innovation and Technology" as a strategic pillar (i.e. normative dimension) focused on enhancing ways of working, improving members' digital capabilities, and ensuring business systems and processes are fit for purpose (NSW, 2023/24). This highlights how mimetic dimension reinforces the normative dimension of the Institutional Theory within community-based emergency services.

The third workplace design lever desired for digital transformation in a community-based emergency service consists of symbols (i.e., workplace strategy) discussed under Skills and Wellbeing. This finding reflects management's keen interest in the skills and wellbeing of volunteers and positively correlates with a study recommending the role of management in mitigating the negative impact of relief works (e.g., psychological strain, discontinuing volunteering) on volunteers (Chen et al., 2020; Huynh et al., 2024). Furthermore, appointing senior staff members who are having experience in corporate strategy and change management aligns with the design lever – Symbol and concurs with the skills and wellbeing theme (NSW, 2023/24). Other initiatives are the development of a new strategy every 5 years to achieve the vision and objectives of the organization which includes Mental Health Strategy, Diversity & Inclusion strategy and Public Sector Aboriginal Employment Strategy. This addresses the fourth research gap by identifying a third design lever desired for responsive leadership in community-based emergency services.

The fourth workplace design lever desired for digital transformation is managerial focus, which is discussed under Direct Communication Channel. The management considers volunteers central to the organization and has demonstrated a keen interest in engaging volunteers through open discussions. An example of such discussion was the series of member workshops conducted to receive feedback on the design of fire appliances and next-generation fleet and its expected key capabilities (NSW, 2023/24). These workshops were conducted to ensure safety improvements in relation to truck roll-over and falling object protection in extreme fire-fighting environments. In addition, after consultation with members, an electronic membership portal was launched which helped volunteers to transfer membership applications efficiently (NSW RFS Annual Report [NSW], 2022/23). This finding on volunteer engagement concurs with a study that suggests engagement strategies influence volunteer retention (Huynh et al., 2024). Adopting these approaches at workplaces generates value for the administrators of emergency services agencies by ensuring safe work and ergonomic guidelines. Based on the above implications, symbols and managerial focus are classified as group factors desired for digital transformation. This addresses the fourth research gap by identifying a fourth design lever desired for responsive leadership in community-based emergency

services. The strategies adopted by the management on volunteer wellbeing, skills upgrading, and open communication reflected through Skills and Wellbeing and Direct Communication Channel represent social norms followed by the agency and align with Institutional Theory's normative pressure.

The fifth workplace design lever desired for digital transformation is social media, which is discussed under Social Systems. These social systems, which included social networking, microblogging sites, and online portals, help communicate information to the public and other agencies. The use of social systems in disaster communication aligns with a study that examines sharing disaster content using microblogging sites (Liu et al., 2021; Torpan et al., 2024). Adopting proactive strategies using social media to disseminate information during critical emergencies addresses the diverse needs of the public and adds value to emergency services. For example, 2,492 Facebook posts by the agency reached more than 300 million unique users and 2,351 tweets received over 140 million impressions (NSW RFS Annual Report [NSW], 2019/20). The agency also used social media to promote cultural diversity. In another instance, brigades successfully held pandemic-safe events, including social media campaigns and virtual tours of agency stations, appliances, and equipment to engage and inform the public (NSW, 2021/22). Analysing volunteer postings on the agency's social systems can offer rich insights into the challenges faced by volunteers during agency's digital transformation. Management should proactively address the digital literacy gap between younger and older volunteers by developing targeted strategies to support their engagement and capability development.

Based on the above implications for emergency agencies, social media is classified as an organizational factor desired for digital transformation. This addresses the second research gap by identifying a fifth design lever desired for employee connectedness in community-based emergency services. The communication strategy adopted to address the public's diverse needs in emergencies indicates social norms and aligns with the normative pressure of Institutional Theory.

Systemic learning is the sixth workplace design lever desired for digital transformation, which is discussed under Digital Service Capability Development. The value generated by the digital version of the harvesting guide to farmers and harvesters reflects the importance of developing digital service capability in community-based emergency services. This finding agrees with a study that indicates how digital services generate value for stakeholders (Wulf et al., 2017), especially in the context of customer-oriented digital service flexibility (Khuntia et al., 2024). The agency, in collaboration with the farmers' association, developed the Farm Fire Unit Operational Guide and Commitment Strategy to help mitigate fires in rural areas, recognizing that farmers possess valuable knowledge of the local terrain (NSW, 2023/24). This helped the agency to establish an integrated relationship with farmers. Based on the above implication to stakeholders, systemic learning is classified as a group factor desired for digital transformation. This addresses the third research gap by identifying a sixth design lever desired for responsive leadership in community-based emergency services. The organization-led digital initiatives built on rules and regulations recommended by external entities align with the coercive pressure of Institutional Theory. The coercive dimension of the Institutional Theory has influenced the agency to adopt – "Resilient Communities and Valued Partnership" as a strategic pillar (i.e. normative dimension) to guide its action and outcomes for both its members and communities (NSW, 2023/24). This highlights how coercive dimension reinforces the normative dimension of the Institutional Theory within community-based emergency services.

Based on the above findings, we recommend three strategies that will generate value for emergency management agencies engaged in digital workplace transformation:

- First, design a unified physical operations center that enables face-to-face communication among stakeholders within and across agencies participating in emergencies for timely decision-making. A physical operations center is important, as it helps to build long-term relationships among the members of agencies participating in emergencies and supports the seamless flow of information across agencies and the media, limiting the spread of misinformation. It can be established by assigning a limited number of members from agencies (e.g., police, ambulance, parks and conservation department, and utility services) participating in emergencies to the physical operations center, which is managed by Community-based Emergency Services. Furthermore, from a change management perspective, for the physical operations center, a stagged transition must be considered to minimize the impact on on-going emergency operations. It would be easy to manage the activities of the operations

center if the center is governed along with the area operations and operations support team. From a sustainability standpoint, the design of the operations center should integrate energy, water, and environmental efficiency considerations that enhance environmental ergonomics. It is also recommended that the agency develops a five-year strategic direction (e.g. focus on resilient communities and valued partnerships), aligned with its overarching vision. This would guide leadership decision-making and support effective planning and resource allocation to achieve the agency's vision and strategic objectives for both its members and the communities it serves.

- Second, design an automated and interoperable communication infrastructure between emergency services agencies for the timely allocation of resources (e.g., volunteer availability and incident routing information) necessary for firefighting. An Integrated Communication Infrastructure can be established by integrating relevant internal systems of agencies (e.g. fire mapping software) to automatically share information across other fire agencies to support coordinated resource allocation and populate data for completing brigade incident reports during emergencies.
- Third, establish a social communication channel without status boundary enforcement to enable direct, two-way communication between volunteers and senior management of emergency services agencies. The social communication channel helps the senior staff members share information on the agency's future developments (e.g., technology adoption and volunteer training), connect volunteers with one another, and share resources. A social communication channel can be implemented using video conferencing software (e.g., Zoom) where members of emergency services can actively participate and ensure transparency in the operations (e.g., funding distribution for critical projects) of community-based emergency services.

Based on the above discussion, we summarize the theoretical and practical implications in the next section.

Theoretical contribution

To the best of our knowledge, this is the first study which examines digital transformation through the lens of Institutional Theory. The coercive, normative, and mimetic elements of the Institutional theory were evident in this study. It was also evident that the coercive dimension reinforced the normative dimension of institutional theory within the context of community-based emergency services.

The themes in community-based emergency services which are relevant to the mimetic element are Cross-silo Collaboration and Integrated Communication Infrastructure. With respect to the normative element, the themes identified were Skills and Wellbeing, Direct Communication Channel and Social Systems. Lastly, the coercive element is linked to the Digital Service Capability Development theme.

Practical contribution

The implications for practitioners are as follows. Firstly, a unified physical operations center that can promote communication, collaboration, and long-term relationships among stakeholders in emergency services. In addition to pandemic response, the physical operations center could also be utilized in situations such as terror attacks, civil unrest, and cybersecurity incidents, where real-time communication and coordination between police, emergency services, and government agencies is essential.

Secondly, an Integrated Communication Infrastructure that helps stakeholders to coordinate resource allocation during emergencies which is vital for community-based emergency services for efficiently managing incidents. Thirdly, establishing a social communication channel that can support a fair and transparent discussion of resources allocation to stakeholders in community-based emergency services.

Conclusion

In this study, we identified the design levers, the overarching themes found in digital workplaces and the value they generate in community-based emergency services. We identified organizational and group factors required for digital transformation in community-based emergency services. One of this study's theoretical contributions is applying Institutional Theory on a community-based emergency service to

identify the digital workplace design levers necessary for digital transformation. The adoption of digital workplace design levers reflects deinstitutionalization. A few instances in this study are face-to-face communication across stakeholders in the physical space and unified communication across the digital infrastructure in community-based emergency services. The themes of community-based emergency services generated in this study were successfully mapped to Institutional Theory's coercive, normative, and mimetic elements. From a practical perspective, administrators of other community-based emergency services can focus on collaboration among the stakeholders of emergency services, implement an integrated communication infrastructure and provide a channel for volunteers to directly communicate with the management to enhance employee connectedness and responsive leadership necessary for digital workplace transformations.

Regarding study limitations, data were collected from two online bulletins published by the NSW-RFS and triangulated with data from the agency's annual reports (2019 to 2024). This is why diverse data representing the social media and systemic learning design levers were not found in this study. In addition, including the dataset published before the pandemic and after the pandemic will provide insights into change management adopted by the organization. Another limitation is the lack of individual factors (e.g., attitudes and resistance) identified for digital workplace transformations. It is anticipated that examining the social media sites of NSW-RFS and conducting interviews with the volunteers and management of NSW-RFS would provide further insights into design levers and individual factors that are yet to be identified in community-based emergency services. Future research will explore employee-level perspectives to understand their responses to digital workplace transformations within community-based emergency services.

Furthermore, the influence of culture on digital workplace dimensions is yet to be explored. Extending this study by interviewing stakeholders would provide insights into the deinstitutionalization of established organizational practices, which could extend theoretical contributions of digital workplace transformations in emergency services.

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Note: The content is the thoughts and opinion of the writer only and the NSW RFS has not contributed to the development of the article