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Digital Workplace Components and their Value in Emergency Services

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Abstract

The digital workplace, which is characterized by its components - physical space, technology, and people, plays a significant role in the digital transformation of organizations. The purpose of this study is to identify the components of a digital workplace in a community-based emergency service organization and to understand its value to various stakeholders. Most existing studies in emergency services discuss general benefits without relating them to specific components of the digital workplace or their specific value for stakeholders. This study is based on data collected from the New South Wales – Rural Fire Services (NSW-RFS) and uses the case study methodology. As a result of our analysis, we identify three values (social, emotional, and functional) eventuating from the digital workplace components in a community-based emergency service organization. The physical space component of the digital workplace generates social value, the technology component generates functional, social, and emotional values, and the people component generates mainly functional value for stakeholders. It was evident that technology provides all three types of values for stakeholders when compared with the other two components of digital workplace. Theoretical and practical implications are discussed.

Keywords

Digital workplace, Values, Dynamic capabilities.

Introduction

The digital workplace has received greater attention from researchers and practitioners since many organizations have embraced the concept of remote working worldwide (Chatterjee et al., 2023). The digital workplace has created many changes in the way we work, new expectations of the job, and additional resources to support such transitions (Rice and Pennington, 2024; Cetindamar Kozanoglu and Abedin, 2021; Alieva and Powell 2022). Hence, digital workplace is a priority for many organizations due to its significant impact on employees and their workplace experience (Kane, 2015). For a digital workplace to be effective, considerable attention must be paid towards the design of organizational strategy, people involved, and technologies used (Williams and Schubert, 2018). The digital workplace can create relationships building opportunities among employees (Kietzmann et al., 2013) but they must continue to comply with behavioral code in the new workplace (Chen at al., 2012).

On the other hand, for the administrators of organizations new leadership skills are necessary to manage employees in this new environment (Huy and Shipilov, 2012). Other challenges eventuating from digital workplaces include technostress and anxiety (Marsh et al., 2022). Despite challenges, digital workplaces are increasingly essential for organizations due their widespread impact on business operations (Kraus et al., 2022). The digital workplace has been studied in different industries including healthcare (Raimo et

al., 2023), and education (Renz et al., 2023). But limited studies have examined digital workplace in community-based emergency agencies (e.g., New South Wales – Rural Fire Services (NSW-RFS)) that are primarily supported and operationalized by a large number of volunteers. Furthermore, a few studies have examined digital workplace at a macrolevel (Zimmet et al., 2023; Gkinko and Elbanna, 2023) without examining the specific value (i.e., functional, social, and emotional) generated for stakeholders. Studies that examine digital workplace at a microlevel with respect to the components of digital workplace (i.e., physical space, technology, people) in emergency service agencies are even more sparse (Dery et al., 2017; Mirbabaie and Marx, 2024). Hence the aim of this study is to examine the components of digital workplace and their specific value for the stakeholders of NSW-RFS in Australia, which is the world's largest volunteer-based emergency service agency (more than 70,000 volunteers).

Related Work

Dynamic capability is defined as an organization's ability to embrace internal and external competencies in response to rapidly changing environment (Teece, 2017). Dynamic capabilities of an organization include sensing (harnessing outside opportunities), seizing (generating value from those opportunities) and transforming (continuous improvement). To address challenges of the Covid-19 pandemic and maintain dynamic capabilities, many organizations allowed employees to work from home (Chatterjee et al., 2023). Thenceforth, the concept of digital workplace increasingly requires special attention. Most organizations recently experienced an acute need to reexamine their dynamic capabilities due to the uncertainties brought by the pandemic. It was found that dynamic capabilities have influence on the digital workplace which also affects the wellbeing of employees, and organizations' performance (Chatterjee et al., 2023).

Several studies have recently examined digital workplace in the context of future of work and its associated opportunities and challenges (Cetindamar Kozanoglu and Abedin, 2021; Alieva and Powell 2022; Marsh et al., 2022). Although an organizational strategy, people and technologies all interact in a digital workplace, it was identified that the digital literacy of people (Cetindamar Kozanoglu and Abedin, 2021) is a particularly important factor for the affordance of digital workplace. Potential benefits of digital workplace include an increase in the productivity of employees, communication and collaboration across stakeholders, and engagement, and innovation among employees (Attaran et al., 2019). On the other hand, digital waste - defined as any non-value adding activities influenced by technologies - is a prominent challenge in the digital workplace (Alieva and Powell 2022). Additionally, technostress is another major challenge faced by employees in a digital workplace (Marsh et al., 2022). Technostress contributing factors include email overload, frequent interruptions, and distraction due to technologies, limited family time due to extended office hours, employer's monitoring, and the need to continuously learn new tools (Marsh et al., 2022).

The analysis of literature on digital workplace indicates that its impact (benefits and challenges) has been felt in various domains. In health, the technology component has contributed to reduce healthcare inequalities, increase the quality of healthcare and employee well-being (Raimo et al., 2023). For example, to improve the survival rates in medical emergency situations, an Artificial Intelligence enabled solution was found to be helpful for stakeholders to allocate resources to hospitals and develop emergency-related policies for the future (Johnson et al., 2023). In education, a dynamic capabilities approach has been adopted to understand skills required in a digital workplace.

The definition of digital workplace used in this study include three components, the physical space, technology, and people (Baumgartner et al., 2021). The physical space refers to places where stakeholders of an organization work in teams or individually. The physical space provides an opportunity for stakeholders to interact and establish relationships for the future. The technology component refers to the information systems that stakeholders use to get their work completed efficiently and accurately. The people component refers to the contribution of stakeholders to organizations in terms of their expertise or skills valuable to the organization e.g. leadership qualities. Although the three components play a significant role in the transformation of workplace in major businesses (Dery et al., 2017), organizational AI systems (Gkinko and Elbanna, 2023) and in the automobile industry (Zimmet et al., 2023), limited studies have examined the value generated by these components to the stakeholders of community-based emergency services where majority of the members are volunteers.

To understand the implications of digital workplace to stakeholders, we follow the taxonomy of values introduced in (Sweeney and Soutar, 2001) where the concept of value has been defined into three types: social, functional, and emotional. The social value refers to the influence generated by others at the workplace. For example, the interaction between stakeholders which results in building relationship is an example of a social value. The functional value refers to the utility experienced by stakeholders because of completing a task. For example, completing a task efficiently and accurately at the workplace results in functional value for the stakeholders. The emotional value refers to the feelings experienced by stakeholders because of completing a task at the workplace. Although values and their interrelations have been discussed (Rasoolimanesh et al., 2020; Furukawa et al., 2019), none of the studies have discussed these values in the context of digital workplace in community-based emergency services. Hence the aim of this research is to address this gap in the literature by answering the following research questions.

RQ1: Which components of digital workplace are evident in community-based emergency services?

RQ2: Which stakeholder values are evident in community-based emergency services?

RQ3: How are the components of digital workplace related to stakeholder values?

Research Method

In this study a case study methodology has been adopted to generate an in-depth understanding (Palvia et al., 2003) of how digital workplace components generate value for stakeholders in community-based emergency services. The organization selected for this study is the NSW-RFS, which is the world's largest volunteer-based fire service agency with over 70,000 volunteers (Fast-Facts, NSW-RFS). There are 1982 brigades serving the 110 local government areas. Furthermore, in 2020/21, there were over 22,000 incidents and in 2022/23, there were more than 24,000 incidents attended by the agency. The incidents attended by the agency include bush/grass fires, structural fires, motor vehicle fires, motor vehicle accidents, assisting other agencies, and storm and flood. This unique characteristic makes this agency an appropriate case for this study. The method used to analyze data is thematic analysis which is appropriate for qualitative data analysis (Braun and Clarke, 2006) especially in emergency management (Kurian et al., 2021).

Data Collection

The data for analysis was collected from two bulletins published by the NSW-RFS in 2020. The bulletins are published every six months. The bulletin had text and image content. Only text information was collected for analysis. In the first bulletin there were 60 pages of content and the second bulletin had 56 pages. The data is accessible via the TROVE online library database hosted by the National Library of Australia. We used the print version of the bulletin which is free of cost and sent to registered users. The data was collected manually from the two bulletins. The public data helps to understand agency's duties, achievements, and involvement in community services.

Data Analysis

The data analysis followed six steps of thematic analysis. In the first step, the two bulletins were read by the researchers to understand the content in detail. In the second step, the content was manually coded based on the three components of digital workplace (Baumgartner et al., 2021) (the physical space, technology, and people). The inter-rater reliability (McHugh, 2012) among the researchers helped to ensure consistency in coding. The physical space resulted in 98% interrater reliability, followed by technology with 98% and people with 92%. In the third step, the three themes for value were generated. In the fourth step, the themes were reviewed and in the fifth step those without data support were removed. In the final step, the themes generated are reported to understand the value of digital workplace for stakeholders. In the next section, the value for stakeholders is discussed.

Value for Stakeholders

The value for stakeholders discussed in this study can take three forms which are social, emotional, and functional. These values can occur from the physical space, technology or people component of a digital

workplace. Each of these is discussed next with reference to the digital workplace component and sample quotes from the case study.

Physical Space

The NSW-RFS used a state operation center to manage and coordinate emergencies spread across the state. The center was used to manage bushfires, and this was accomplished efficiently since the center was able to accommodate internal and external stakeholders. These stakeholders were from the police department, health department, international firefighting agencies, government, and other emergency services. The center was also used to manage the Covid-19 pandemic. The Australian Defense Force was also one of the stakeholders who took part in this. The center could accommodate hundreds of members from the various agencies, and this helped to establish quick communication and coordination to resolve an incident. In addition to this, the internal and external stakeholders were also able to establish long-term relationships which is essential to manage critical emergencies now and in the future. The design of the state operation center also helped stakeholders to communicate easily since the operation controller who was positioned in the middle of the facility was able to facilitate the flow of information among stakeholders with ease. An example quote representing collaboration and relationship building among internal and external stakeholders which eventuated from the state operation center (i.e., physical space) is –"*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; 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 organizations, government agencies and other emergency services "*. Thus, the stakeholders were able to establish collaboration and to build relationships while working in the state operation center. This is a clear example of how the physical space component of digital workplace generates social value for stakeholders.

Technology

Several technologies were used by the NSW-RFS to coordinate emergencies. The systems were able to communicate the availability of volunteers so that timely allocation for an incident could be accomplished. Other tasks facilitated by systems were disseminating information about incidents, how to reach the incident location and to generate incident reports that could be archived for later reference. Other systems used by the NSW-RFS were predictive systems to generate fire spread prediction maps which helped NSW-RFS to communicate the spread of smoke and its impact to communities. Other systems also included forward-looking infra-red cameras to assist volunteers on the ground searching for missing people. An example quote which represent tasks accomplished by various technologies 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; The FLIR camera will also be able to detect thermal signatures of missing persons in certain environments, enabling detection and rescue; 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*". Thus, the stakeholders were able to complete time critical tasks in emergencies using various technologies implemented at NSW-RFS which makes it evident that the technology component of digital workplace generates functional value for stakeholders.

The NSW-RFS has collaborated with the National Library of Australia to digitize and archive all the information published in bulletins accessible via an online search portal. Those contain information and images of volunteers containing the fire and saving properties and lives. The agency also took care of its volunteers and the wellbeing of the public by suggesting technological interventions to reduce social isolation during the pandemic. In addition, the volunteers received health and well-being advice. An example quote 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; Connect by giving someone a call, having technology-free time with your family, bringing out old board games or using FaceTime with friends". Thus, the online portal was able to disseminate the dedication of volunteers which makes it evident that the technology component of digital workplace creates emotional value for stakeholders.

The management of NSW-RFS also regularly organize live Q&A sessions which were attended by several volunteers spread throughout the state. Topics discussed in these sessions include tips on how to work remotely, health and well-being of volunteers and their families, and how to engage with the community. In addition, the management updated on the new technologies being rolled out in the agency, training and recruitment of new volunteers in the brigade, and collected feedback from volunteers on how to allocate funding for projects in the agency. An example quote is – "*Guests for the live Q&A sessions have included Commissioner and Assistant Commissioners; 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*". Thus, the communication channel used to keep in touch with volunteers and their families, to provide support, and to collect feedback on future project funding are clear evidence in this case study that the technology component of digital workplace creates social value for stakeholders.

People

The volunteers working at NSW-RFS had the necessary skills and contextual knowledge. This clearly helped the agency to timely and effectively allocate required resources to handle critical emergencies. The vast knowledge of the volunteers and their skills were appreciated by the management of NSW-RFS since it helped to mitigate incidents in a timely and ordered manner. An example quote which reflects the skills and knowledge of volunteers is - "*I'm sure that if we didn't have these experienced local people in IMTs, the losses would ultimately be much worse*". The NSW-RFS collaborated also with farmers and developed a grain harvesting guide. This provided information on the best time to harvest, taking into account external factors such as temperature and humidity. This helped farmers to make informed decisions and to avoid critical fire incidents while harvesting. An example quote 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*". Thus, the emergency services agency was able to resolve critical incidents by utilizing the skills and knowledge of experienced volunteers which is clear evidence that the people component of digital workplace in this case study generates functional value for stakeholders.

Discussion of Findings

In our analysis, we identify three types of values (social, emotional, and functional) eventuating from the digital workplace components in a community-based emergency service organization. The physical space component of digital workplace generates social value, the technology component generates functional, social, and emotional value, and the people component generates functional value for stakeholders. It was also evident that technology provides all the three values for stakeholders when compared with the other components in a digital workplace.

The physical space which generates social value for stakeholders is significant in community-based emergency services since the relationship established between the various stakeholders of emergency services enable them to address future emergencies efficiently. This was evident when the same physical space which was used to contain bush fires was used by stakeholders to manage the Covid-19 pandemic. Hence, the physical space is clearly an important component in the digital workplace that helped stakeholders to establish and maintain strong relationships for the future. This finding is in consensus with the employee connectedness dimension which is essential for enhancing employee experience in the digital workplace (Dery et al., 2017). The physical space also helped the management to communicate effectively to the media which could mitigate the spread of misinformation during critical emergencies. This finding is in consensus with the responsive leadership dimension which is essential in the digital workplace (Dery et al., 2017). Hence the first recommendation to emergency services agencies is to establish a well-equipped physical space that will help to maintain communication and relationship building among domestic and international stakeholders. Hence, a hybrid working environment (stakeholder representatives in the state operations centre and staff in other emergency management agencies) is most appropriate for emergency services where volunteers play a significant role in

addressing critical emergencies through communication and relationship building with other stakeholders.

In community-based emergency services, the people component generates functional value in the context of applying their valuable skills during emergencies. The functional value can be further enhanced through the physical space which provides an opportunity for stakeholders to communicate and build relationships. Hence the second recommendation to emergency services agencies is to enhance the functional value of volunteers by organizing team visits and training sessions across emergency service agencies. This could help in generating social value that further facilitates functional value (e.g., sharing skills) for stakeholders which could be useful in future emergencies.

Among the three components of digital workplace, only the technology component generates emotional value along with social and functional value. Hence, technology is a significant driver of digital workplace in terms of its value to stakeholders. The emotional value is generated based on the dedicated work of volunteers. This work is represented and shared through the images of volunteers containing the fire and saving properties and lives. Based on the emotional value, the third recommendation to emergency services is to create promotional information including videos that show the dedication of volunteers in protecting and saving properties and lives. This could be presented during the orientation sessions at the institutes of higher learning which could attract potential young volunteers for the future. It is also a way to embrace and promote an inclusive culture in emergency services. Such initiatives are particularly impactful in a multicultural society where the emergency services often rely on public marshaling for public events, e.g. missing person search and rescue, clean up campaigns, etc.). The findings are illustrated below in Figure 1.

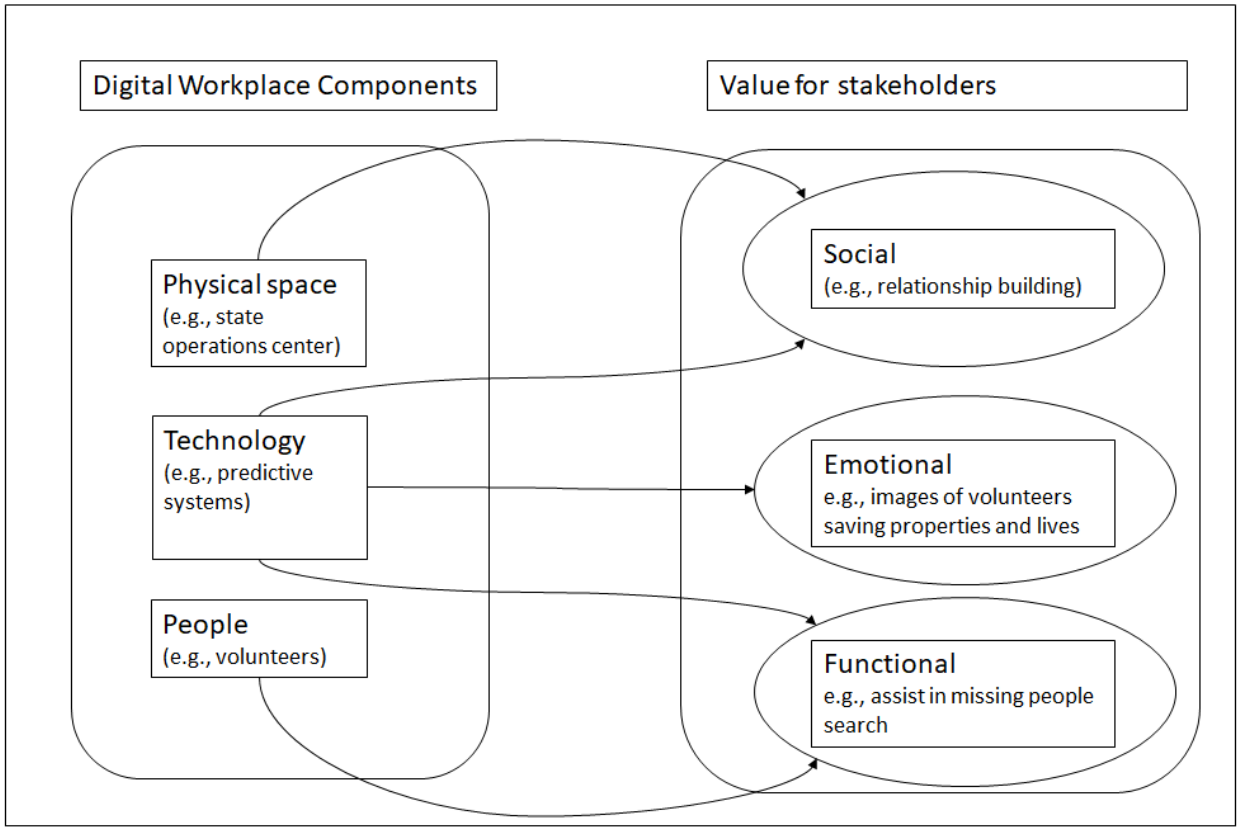

Figure 1: Value for stakeholders

The three recommendations from this study for other emergency services agencies are summarized below. First, implement a hybrid working environment which includes a well-equipped physical space for communication and relationship building among domestic and international stakeholders. Second, organize team visits and training sessions across emergency service agencies to generate social value that

further facilitates volunteers' functional value. Third, disseminate information on the dedication of emergency services volunteers to attract potential young volunteers for the future and promote an inclusive culture in emergency services.

In summary, to answer the first research question, the components of digital workplace that transpire in the community-based emergency service are the physical space, technology, and people. To answer the second research question, the social, functional, and emotional values were evident in the community-based emergency service. To answer the third research question, the physical component was related to the social value, technological component was related to the social, functional, and emotional values and the people component was related to functional value.

From a theoretical perspective this study extends the theory on digital workplace by integrating the components of digital workplace with stakeholder values. The findings of this study align with the three characteristics (sensing, seizing, and transforming) of Dynamic Capabilities (Teece, 2007). Sensing refers to building relationships with external stakeholders (e.g., international agencies) in the physical space. Seizing refers to generating value from such relationships by receiving support (e.g., advice and volunteer support) from international agencies to mitigate critical incidents. Transforming refers to the continuous training sessions organized across emergency services agencies for transferring knowledge and skills. From a practical perspective this study will support and inform emergency management services in making strategic decisions, by considering the digital workplace components and value perspectives while investing public funds for the adoption of new technologies or the upgrade of existing ones.

Conclusion

The aim of this study was to understand how the key components of digital workplace generate value for the stakeholders of community-based emergency services. Out of the three digital workplace components, the technology component generated all three - social, functional, and emotional values. Whereas the physical space component generated only social value and the people component generated only functional value. Based on these findings, three recommendations are provided to the management of emergency services. These recommendations if implemented strategically could positively impact the social connectedness and wellbeing of various stakeholders at workplace. In addition, strengthening the volunteer-base is yet another potential benefit for emergency services. One of the limitations of this study is that only text analysis was conducted on the two bulletins published by the NSW-RFS. The analysis could be extended to include a few more bulletins in the next stage of the project. Furthermore, stakeholder interviews will be conducted to extend the findings of this study.

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