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**INTERNATIONAL JOURNAL OF INNOVATION IN
ENTERPRISE SYSTEM**Journal homepage: <https://ijies.sie.telkomuniversity.ac.id/index.php/IJIES/index>

e-ISSN: 2580-3050

Workplace Digitalization in Public Sector Organization Towards Operational Effectiveness: Current Landscape, Issues and ChallengesNur Azaliah Abu Bakar^{1*}, Zakaria Deraman², Mohamad Fadzli Tarmiji³, Rohani Yusoff⁴, Nazri Kama⁵^{1,5} Universiti Teknologi Malaysia

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Article history:

Received 15 September 2018

Accepted 16 January 2019

Published 31 January 2020

ABSTRACT

To date, public sector organisation begin to implement the digital workplace as part of their digital government initiative but yet there is proven the success of its implementation and how it impacts the government operation effectiveness. Therefore, based on a Technology-Organization-Environment (TOE) framework, this paper aims to investigate the current landscape, issues and challenges in workplace digitalization in public sector organization. A comparative analysis of the digital workplace approach was performed on nine Malaysian Public Sector organisations of the various business core function. This study found that there are nine factors related to digital workplace implementation. The main finding revealed that most organisation are not fully optimizing the digital workplace functionality and only using it as a digital repository. Based on this finding, significantly it can contribute the development of a new digital workplace framework for public sector organization in ensuring its contribution to operational effectiveness.

Keywords: digital workplace, public sector, TOE framework

I. INTRODUCTION

We are now on the verge of the Fourth Industrial Revolution (IR 4.0) where humans meet the cyber world as technology and people are not distinct, not separate. With the IR 4.0 most all the services become more digital, hence the well-established traditional way of working also has been re-thought in order to be changed [1]. Organization begin to adopt the concept of a digital workplace platform to outperform. Digital workplace refers the term which enables new and more effective ways of working, improves employee engagement and agility, and exploits consumers-oriented styles and technologies [2], [3]. In brief, a digital workplace has a precise goal of creating a consumer like a computing experience that enables teams to be

more effective.

Information on the organization's activities such as events, projects, reporting and lessons learned are often stored within an individual or group of individuals. Organizations face the loss and leakage knowledge whenever applicable retirement, transfer and exchange of officials [4]. Failure to retain and transfer of knowledge leads to increased costs and decreased efficiency in an organization [4]. In maintaining and transferring knowledge within organizations, a digital workplace is a solution to store all the memory and lesson learnt to occur in the organization.

According to Chief Secretary to the Government of Malaysia, Tan Sri Dr Ali Hamsa, the IR 4.0 will greatly impact civil servants, especially in terms of their job scopes [5]. It also will help boost civil servants' productivity and service delivery to the people. There-fore, digital workplace implementation is very crucial in fulfilling the IR 4.0 demand. Malaysian Administrative Modernization and Management Planning Unit (MAMPU), the central agencies in Malaysia who is responsible for governing the government IT initiative diligently encourage all Malaysian Public Sector organization to implement the digital workplace to support an integrated, standardized, secure and trusted data ecosystem across the public sector [6].

Several approaches have been introduced to encourage the digital workplace initiative in the organization, yet there is proven the success of the implementation. Recent studies found out most of the existing digital workplace solution are solely based on desktop productivity technology and neglecting the business alignment angle. It also lacks focus on process transformation aspect as well as the human integration in this workplace digitalization ecosystem [7], [8]. It also lacks sufficient IT infrastructure as well as security challenge [2], [9]. This studies also found out many digital workplace issues such as organizational and work-force are discussed, but none are proposing a solid solution and recommendation specifically in public sector context [10], [9], [11], [12]. Therefore, this paper aims to investigate the current landscape, issues and challenges in workplace digitalization towards a better design digital workplace framework for public sector organization.

II. LITERATURE REVIEW

Digital workplace is an evolution of the physical workplace that changes the environment and culture of the working lifestyle. Digital workplace is an evolution of the physical workplace that changes the environment and culture of the working lifestyle [13]. [14] define digital workplace is a virtual equivalent to the physical workplace which stresses on the strategy for strong planning and management that can give impact to productivity, engagement and work lifestyle performance. Modern working practices and technologies are typically designed to shape the nature of work and affect employees' behavior. Previously, the digital workplace is known as teleworking or virtual working, whereby employees are working remotely from the home, remote offices or other sites for all or most of the working week and connect-ed to the main organization by telephone and computer technologies [15].

In line with IR 4.0, the digital workplace becomes one of the disruptive innovations. Just as increased technology usage has influenced the competencies, self-awareness, and relational expectations of the digital workplace, the way that work is structured and carried out has also been impacted by technological developments. As stated by [2], employees that have a world of information at their fingertips can easily collaborate with colleagues across the globe and able to deliver products with increasing capabilities at de-creasing costs. For instance, digital workplace platforms have become ubiquitous within organizations, and have become central to problem-solving in multi-location and geographically dispersed offices [16].

2.1. Key Elements of Digital Workplace

Detailed analysis by [17] highlighted that there are three criteria that require employees to empower digital workplace. Firstly, the employee must know how to adopt new technology, secondly knows how to solve the problem of critical issues and thirdly, creative thinking on how to deal with new challenges. On the other hand, the component of the digital workplace may vary between organization. The most important component of the digital workplace is people or employees. Next is technology and also management that design the coordinating between people, technology and process [18].

In a study by [19] the other important element of the digital work-place is the domination of digital communication in a working environment. Thus, a reliable infrastructure is a must to achieve this aim. The digital workplace also reinforces on nurturing the culture of knowledge sharing. Two components of knowledge's need to apply are the collaboration and cooperation [20]. Apart from that, the digital workplace requires creating a new working environment. The integration, continuity and collaborations are the ingredients for sustaining this digital workplace environment [21]. Finally, is the utilization of data repository for the digital workplace, whereby it is crucial in managing and tracking the data as long the data were stored in a shared in the directory [22].

2.2. Issues and Challenges in Digital Workplace

Despite these many benefits that digital workplace promises, there are still numerous issues and challenges that stifle many organizations from fully implementing the digital workplace. One of the problems identified is the siloed development of digital workplace, which contributes to the overlapping of resources and cost [7]. In addition, there are also data authority and ownership issues [22] It is also difficult to share information internally and across public sector organizations due to the non-existence of standard data taxonomy as well as information sharing policy [2]. Another issue with digital workplace which is the low motivation of the employee in sharing and collaborating [23]. Furthermore, there are cases of information misused that creating a negative perception for the organization to venture into digital workplace solution [24].

In brief, the digital workplace is the way of how organization operate. It fulfils both business and technology daily task

requirement and at the same time able to retain the valuable knowledge and information. This is also in line with the needs of stakeholders to provide a source of valid information via a single trusted reference point. As the IR 4.0 is approaching, now is the right time to look into the issues, challenges from both technology and business aspects to elevate the digital workplace as another competitive advantage tool for the organization.

2.3. TOE Framework

Technology-Organization-Environment (TOE) framework, is one of the most used theories in explaining IT innovation at the organizational level. The TOE framework by [25] introduced three dimensions that influence the IT innovation in an organization namely technological, organizational, and environmental. The technological context describes technologies or innovation idea that are used by the organization and the technologies available in the market relevant to the organization. Organizational context refers to the characteristics and resources of the organization, such as organization size and resources volume. Finally, the environmental context describes the structure of the industry and the conditions surrounding the organization in which it conducts its business [26].

TOE dimensions have been validated by several studies and have received consistent empirical support. Some of the TOE works are on adoption of Web 2.0 technologies [27], digitalization of SME [28] and impact of social media in the public sector [29]. This indicates the capability of this framework in describing any kind of new IT innovation. Thus, the selection of the TOE framework is appropriate since the digital workplace is also an IT innovation for the organization. This posits a strong justification why this study adopted the TOE framework as its theoretical guidance.

III. METHODOLOGY

Due to the limited empirical insights of digital workplace study, this study saw the need for in-depth examination. A qualitative approach was employed in this study to achieve the research aims of gaining deeper insights into digital workplace practices through open-ended face-to-face questionnaires and focus group workshop [30]. This methodology is particularly helpful when it comes to analyzing internal and external knowledge sharing which enables organizations to manage their digital workplace.

To increase comparability, we aimed for a theoretical rather than a random sample, consisting of organizations in comparable industry settings, environment and infrastructure such as the Malaysian Public Sector organization that implements the digital workplace. The list was compiled based on their full screening of all 750 MPS organizations and finally, only nine were selected given on their unique profiling in digital workplace solution. We ensured that our sample did not only contain fully successful cases of digital workplace solution but also cases where projected goals were not reached and knowledge sharing was not completed successfully. By doing this, we enhanced the comparability of the cases regarding differences in internal and external knowledge sharing and their effects in digital workplace implementation. Table 1 provides detailed information on the nine case studies with digital workplace implementation from the various core business, type and digital workplace.

**TABLE 1
DESCRIPTION OF THE CASE STUDIES**

Cases	Organization Type	Core Business	Years of digital workplace implementation
Case A	Ministry	Science, Technology and Innovation	5
Case B	Ministry	Energy, Green Technology and Water	2
Case C	Ministry	International Trade and Industry	2
Case D	Central Organization	Administrative and Management Planning	4
Case E	Central Organization	Diplomacy and Foreign Relations	4
Case F	Central Organization	National Population and Family Development	3
Case G	Central Organization	Islamic Science University	2
Case H	Central Organization	National Islamic Advancement	3
Case I	Central Organization	Public Works	5

This study uses two approaches to collect and analyze information studies consisting of a questionnaire and focus group workshops. Following subsections describe the approach in detail.

3.1. Questionnaire

The questionnaire was designed to include questions covering the TOE dimensions, which are technological, organizational and environmental with a total number of 27 respondents consist both business and IT officer in the organization who involve in digital workplace implementation. It was an open-ended questionnaire, whereby the respondents are given the freedom to provide their own answers.

3.2. Focus Group Workshop

In addition, this study also conducted a focus group workshop with all the participant from these nine organizations. These participants are the team members of the digital workplace project as well as the end users. The aim is to get the in-depth information of the digital workplace implementation, issue and challenges in their organizations. During the focus group session, the discussion was sometimes orientated so as to discuss specific topics. The transcripts of the discussion were content-analyzed by the technique of coding, which divided the relevant content of transcripts into categories of different themes following [30] methods of qualitative data presentation.

IV. RESULT AND DISCUSSION

In the following sections, we present the results of our empirical research on the current state of the digital workplace in the Malaysian public sector. Firstly, from the questionnaires, we gather information about the digital workplace implemented in each organization and classified according to the TOE framework. Followed by presenting the focus group results to provide an in-depth explanation of the current state discussed.

4.1. Questionnaire Findings and Analysis

Guided by TOE Framework, this study identified five factors related to digital workplace implementation in Malaysian Public Sector. The factors are arranged to the TOE dimensions as follows:

Technological Dimension

Information and Content: It is found that 56% of the digital workplace in the organization have established process workflow meanwhile the other 44% digital workplace does not define the process at all. Furthermore, a total of 72% digital workplace are completed with a taxonomy structure compared to the rest 28% are without the taxonomy structure. Meanwhile, the most common contents stored and shared in the digital workplace are in documents form, images and videos which are deposited into the specific folders according to the file format such as MPEG, mp4, avi, ppt, Web page, jpeg, doc, pdf and txt. These findings indicate that most organizations begin to set up a process workflow and taxonomy structure in their digital workplace design. Only that, there is no standard notation or for-mat across the public sector that resulting in various format and file type are deposited into the digital workplace repository.

Security and Audit: The study found that a total of 89% digital workplace implemented is fully equipped with a secured and assured data protection, meanwhile, there are still 11% of the digital workplace that is still lack of Data Security protection. A total of 61% of the organization already has a Disaster Recovery Centre for their digital workplace system compared to other 39%. While 89% of organizations had a proper Access Control for their digital workplace system compared to the rest of 11% organizations. These findings suggest that a lack of emphasis on the security aspect in current digital workplace implementation in the Malaysian public sector. The respective team needs to look into this matter immediately as this may lead to a serious threat if the digital workplace system being hacked.

Collaborative Platform: The other consideration in the technological dimension are the accessed mode, development method and platform type. It was found that 61% of digital workplace application can be accessed through the website only, while 39% of the repository can be accessed by both website and mobile. A total of 61% of the organization digital workplace were developed in-house, 17% for Joint Application Development (JAD) and 22% are outsourced. A total of 67% of the repository is developed on an open source plat-form, 22% on the mixed platform and 11% employ the proprietary platform. A higher number of in-house developments on open source technology explained that most of the organizations prefer to implement and customized their own digital workplace solution.

Organizational Dimension

Business Value: It is found that only 17% of digital workplace implementation fulfil the organization business needs and achieve the KPI. While the rest of digital workplace implementation is just for repository purposes, to store and share the documents. This indicates an underutilized used of digital workplace platform.

Environmental Dimension

Policy: It is found that about 72% of the digital workplace implemented are equipped with clear policies and guidelines and only 28% digital workplace does not have it. A total of 78% of the organization has a monitoring mechanism repository compared to 22% of organizations are without it. In addition, a total of 83% of organizations had established a special

committee for digital workplace implementation compared to 17% without any dedicated committee. The findings also showed 50% of repository development are led by the champion appointed in every department of that organization. Finally, the study also found out 77% of organizations have a proper change management plan to support the digital workplace implementation meanwhile, 23% did not develop any plan for the digital workplace implementation. In brief, it can be assumed that most organizations still do not have sound governance for the implementation of the repository.

4.2. Focus Group Workshop Findings and Analysis

From the focus group workshop, there are four additional factors which are 1) digital work-place acculturation, 2) authentication access, 3) storage technology and capacity, and 4) governance structure.

Digital Workplace Acculturation: It is found out that most data owners refuse to share information and knowledge because it is considered as the additional workload on them. The focus group respondents also agreed that the level of awareness among organizations in using the digital workplace platform in their operational job is still low. This also can be due to a lack of top management commitment to digital workplace implementation as well as there is no sustainability plan exist to maintain the continuous use of digital workplace.

Authentication Access: One of the major concerns in digital workplace usage is on handling the classified information. Currently, most of the documents in the digital workplace are open documents which can be accessed by everyone within the organizations. In addition, it is also found out that some digital workplace has no audit trail feature to trace the movement of the original file source. Thus, this becomes a challenge to access additional information or clarification.

Storage Technology and Capacity: Currently, users are burdened by multiple access control for the various systems in the organization. Furthermore, the network infrastructure performance is not optimizing to support the digital workplace platform. The existing digital workplace also does not limit the shelf life of the document stored, hence this will cause insufficient storage issues in the near future. To worsen the case, in some organization there is insufficient storage capacity to store all files and organization are facing financial constraints to upgrade to a better infrastructure.

Governance Structure: It is found out that some organizations do not set up a committee to monitor the implementation of the digital workplace. There is also a lack of promotion, recognition and reward in using digital workplace. The silos implementation of the digital workplace by organizations also lead to redundancy and waste of infrastructure. Furthermore, there is no digital workplace policies, guidelines and standard operating procedure as a reference and guide the organization.

V. CONCLUSION AND FUTURE WORK

Digital workplace able to be enhanced user experience with complete end-to-end management by providing a single point of access to data and applications securely, instantly, intuitively, from any device anywhere and anytime. The digital workplace can provide better productivity, secure access to data and applications tailored to individual workers whilst maintaining the highest level of security. The digital workplace also gives freedom and control for both employees and IT by creating an agile and secure workplace. In addition, the built-in security features in the digital workplace offer robust compliance by combining both employee identity and device management.

Realizing a massive potential of the digital workplace in the future working environment, the next phase of this study is to design a new digital workplace framework for the public sector in ensuring its contribution to operational effectiveness. Every issue and challenges identified in this study will be considered when designing the framework. In the long run, this study foresees that digital workplace will be able to contribute to cost optimization through increased automation, virtual agents and delivery of integrated self-services tools. Finally, this will improve customer satisfaction because when all employees are engaged via a digital workplace, is also increase the internal capability and bring a competitive ad-vantage.

ACKNOWLEDGMENT

The research is financially supported by Universiti Teknologi Malaysia (UTM) PAS Grant Q.K130000.2738.03K32.

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