Digital Workplace Model for Research University Publication Collaboration

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Abstract—**Digital Workplace is a virtual equivalent to the modern version of the traditional workplace where an employee can work anywhere by using any devices, browsing files and sharing knowledge. Meanwhile, MyRa is commonly known as Malaysia Research Assessment tool for measuring research performance indicator in public university. In order to achieve MyRA objective, research university boosts the research publications from academicians. However, from all submission, not all publication papers are achieved a high standard, which causes low stars rating. The absence of a working digital repository for research publication is among challenge face by most academicians in searching for research paper collections as a reference. Besides that, they unable to keep in touch with the author of a research paper in getting advice and feedback for their working documents. Thus, this study aims to propose a digital workplace model focusing on research publication. Two methods are used to achieve the aim of this paper, which is literature review and interview. Initial findings highlights, there are five main dimensions associated with establishing this model which are communication, environment, strategy, collaboration and community.**

Keywords—**collaboration; digital repository; digital workplace; knowledge management; research university;**

I. INTRODUCTION

The digital workplace is the virtual, modern version of the traditional workplace where the employee can work anywhere by using any devices, browsing files and sharing knowledge. This working culture becomes a trend in an organization as an effort to improve efficiency and performances. The idea of the digital workplace is based on recent trends, bring your own device (BYOD) and Internet of Thing (IoT) aim in helping the employee to communicate and distribute task among the team.

Digital workplace is a directory where a collection of files which contains references to other computer files are gathered and collected and keeps in a server [1-3]. Normally, in the local network, this file directory is kept in a local computer where it gives limited authority access where any editing cannot do on the fly. However, nowadays with a high-speed internet connection and cloud service storage, this digital directory becomes a phenomenon where files directories are now provided with capabilities of editing content, sharing and deleting files. Studies by Deloitte, Dahlan, Abdullah et al. and Dahmen, Wöllecke et al. stated that, with the evolutionary of interesting interface web page layout, digital workplace enables collaborations with different tools and apps that give variety in directories features [4-6].

In industries workforce, digital workplace is slowly embraced in working culture where it definitely changed the companies would continue to operate [7-10]. By using the latest mobility services and digital technology, it adapts the way people to work to increase employee engagement and satisfaction [2, 5, 11]. IT Industries such as Accenture, Dell, Hewlett-Packard (HP) as a few have been implementing digital workplace in engaging their working environment that achieves clients' satisfaction.

Meanwhile, in the academic workforce, digital workplace is started to be adapted to

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teaching tool materials [12, 13]. For example, lecturers start applying online digital class for a student in which students able to follow lecture without attending to class especially for working student that has limited time to engage with lecturers. The recorded video, for example, can be played back which it helps the student to understand what they had learned in class. Furthermore, sharing documents helps the student to keep track all the available slides and exercises.

In a knowledge perspective, this workplace directory is defined as a tool of the institution of knowledge management. According to Nissen, Kasemsap, Olaisen and Revang, and Evald et al., knowledge management is the process of capturing, organizing, and storing information and experience of worker and groups within an organization and some directory open for public access [14-16]. In collecting all those artefacts in an electronic environment, knowledge management may give benefit in helping the organization in managing their working documents and smooth their business infrastructure.

MyRa or Malaysia Research Assessment is a tool for measuring research performance indicator in public university [17]. The MyRA instrument is used to engage the research development and innovation activities which outcomes is categorized into six levels, with 'six stars' being the highest and one star the lowest. MyRA is inspired to support the country's socio-economic landscape for seeking its position in the global knowledge and innovation economy. The main purposes of MyRA instruments are to evaluate the performance of local universities in research-development and commercialization [18]. The active performance from the local university and high ratings are important to obtain and maintain the research university status

One of the strategies to achieve MyRA objective is by increasing the number of research publications in the university [19, 20]. However, not all publication papers achieved a high standard, which causes low rating stars in MyRA marks. In addition, there are also cases whereby the academicians lost control to keep in track their research publications, hence unable to update and share their publications to the public [21, 22]. Eventually, this research collection isolated and being ignored by academicians. Due to this issue, most universities are urged to provide a digital repository to keep and monitor this research outcome and publications of their academician [23, 24].

However, the absence of a working digital repository for research publication is among challenge face by most academicians in searching for research paper collections as a reference [25, 26]. Besides that, they unable to keep in touch with the author of a research paper in getting advice and feedback for their working documents. Sometimes, there are research authors who have moved to other university or retired, hence all the knowledge and experience that may help others could not be shared and improvise as there are no digital platforms for them in posting their thoughts. As mentioned by Christian [27] open access intuitional repository is a solution where research knowledge can be accessed by academicians around the world. Hence the boundaries for sharing knowledge is never stopped between academicians and research institution.

In addition, studies by Yu Cheng, Wah Hen et al., Gray, and Madson et al. also found there is a gap between senior academician and junior academician in having good research publication [21, 28]. There are many senior academicians who are having expertise and experience in producing a high-quality research paper compared to a junior academician. One of the reasons for the existence of this big gap is due to the absence of an effective communication channel in sharing the knowledge and collaboration in research publication [29, 30]. In addition, it is hard to retain the knowledge whenever the academician is leaving to other university or retire [31].

Thus to ensure excellent quality in the university research publication, a proper mechanism to be set up. Therefore, the study proposes a digital workplace model as a solution for a new approach to publication collaboration. Digital Workplace is a solution that may help to resolves this issue by collaborating university

research publication platform or systems, MyRA monitoring system and individual academicians digital working space. University can monitor the activity of research publication paper meanwhile, academician can keep track their publication paper and help others who seek advice and improvise their research papers. The flexibility of digital workplace will benefit many academicians in the process of exchanging and collaborating the knowledge.

II. LITERATURE REVIEWS

This section provides a literature review on the digital workplace and on collaboration aspect of research university publication. There is a lot definition these days about "Digital Workplace". While there are many different views on what it actually means, many agree that many job roles are changing rapidly as Information Technology (IT) is overwhelming.

A. Digital Workplace Concept

Digital workplace is an evolution from the physical workplace that change environment and culture of the working lifestyle. With the engagement of digital tools such as email, virtual meeting tools have broken down the communication barrier and producing productivity staff that produces more innovation and growth the business relationship [1, 10, 32-34]. Meanwhile, Marshall defines digital workplace is a virtual equivalent to the physical workplace where stress the strategy on strong planning and management that can give impact on productivity, engagement and working lifestyle performance [35]. Likewise, Köffer mentioned that digital workplace containing a holistic set of tools platform and environment that enable collaboration and sharing knowledge to be productive [36]. Global cities such as Amsterdam, London and Paris are among countries who have been experiencing working style culture to the digital workplace in out space [9].

According to a study, there are three important factors that require employees to empowering digital workplace. Firstly, the employee must know how to adopt new technology, secondly knows on how to solve the problem of critical issues and thirdly obtain creative thinking on how to deal with new challenges [1]. On the other hand, the component of the digital workplace may vary between organization. The most important component for the digital workplace is people or employees, followed by technology and also competent management team that able to coordinate people, technology and process together [35].

In addition, there are four key elements for the digital workplace. Every component in digital workplace is simultaneously supported by strategic planning, governance and operational management, proactive support and high user experience by implementing robust, secure and flexible technology

The first key element is the domination of digital communication in a working environment [37]. Nowadays most of the communications has been done through email, fax, video call and video conferencing where the employees enable to access particular job regardless of their location. This flexibility enables them to respond faster and can work from home [5, 11]. The emergence of smartphone allows employees to execute job task dealing with vendor and customer without having a physical meeting. With the help of WhatsApp applications, for example, enable customers uploading images and videos to transmit information on the fly in which reduce the communication cost [38, 39]. The internet and related web-based technologies are driving forces behind many of the most recent IT tools added to the organization.

The second key element is to nurture culture knowledge sharing. In nurturing knowledge sharing in digital workplace culture, two components of knowledge's need to apply that is collaboration and cooperation [16]. Collaboration enables interaction between peers to share knowledge and using cooperative for transferring the knowledge between team members. Collaboration is characterizing by the high level of trust for sharing or transferring the information and dialogue among peers [14, 40]. The emergence technology influence to the development and high-quality knowledge

sharing. This collaboration platform allows new gateways and creating professional and social habits between team members [41].

Third key elements are digital workplace creating the new working environment. The environment of the workplace plays roles in changing the environment to be more conducive and effective. The integration, continuity and collaborations are the ingredients for sustaining the environment [42]. The online forum has become useful tools for being a virtual meeting for discussing working issues and learn new skills and building new knowledge [43]. Therefore, digital skills was considered as an important skills to adopt changing with the working environment digital workplace provides five services or capabilities started with communication and employee engagement, secondly is collaboration among peers, thirdly sharing information and knowledge, fourth is applications use in business and lastly working agility where employee able to be productive at any time and space [44].

Fourth key elements are data repository utilization for the digital workplace. Nowadays, many working documents are driven by data in the form of web pages. Collaborative work of datasets provides benefit for advance searching for finding specific keyword and provide high performance of data access and sharing. The data repository is able to manage and tracing data as long the data were stored in a shared in the directory [45, 46]. In protecting data from leaked or shared with authorizing access, the license agreement is established and training is provided including data protection, roles and responsibility as users to obey the rule. Training environment encourages learner involvement by foster cognitive development that provides positive attitudes [12]. One of the key differences in the digital workplace is the ability of messages control and corporate stories [47]. However, according to recent studies as the more data increased the more data repository is required as well as increase the cost of maintenance and services, hence organization need to strategically think what is the best way to combat this issues [45, 48].

B. Information Technology Tools in Supporting the Digital Workplace

Even though the impact of the internet is not an issue for every internet consumer, access has changed the routine of those who enjoy it. The various IT tools in the digital workplace such as an email, mailing list, discussion list, internet search engine and web database. Meanwhile, data repository enables for generating a report in which the database can be accessed publicly or private mode [27]. Hence, the digital workplace provides informal learning through instructional design and guideline [13].

IT is a social tool that is essential for effective communication and collaboration. IT tools such an email, instant messaging, discussion list, video conferencing has to change the nature of workplace communications and collaboration [1]. Consumption of IT tools can nurture hands-on practices culture which can positively motivate learning interest and online collaboration course module can develop additional knowledge by experiencing materials and sharing sessions with peers [13, 25, 49]. Using of new IT tools improving the organization to collect and filtering information for decision making and sustaining the performance enhancement despite what levels they are. Therefore, social media recommender mechanism has been introducing for generating discussion treat and recommendation based on semantic keyword similarity to provide effective searching and to avoid spamming [39, 50].

As agreed by most scholars [11, 13, 25, 26, 43, 49, 51, 52], collaborative learning through ICT facilities encourages strong interaction among peers in university and also industry. Blended learning as an example online learning and teaching. Online technologies provide an interactive platform for learning and mutual knowledge sharing. The uploading material on social media network fosters the access material irrespective of time and place for better learning. Hands-on learning practices using IT can nurture positive motivation for learning interest and online collaboration can develop additional knowledge by experiencing materials sharing sessions with peers. Collaborative tools are tools

that allow users to work together in sharing ideas or knowledge for increasing productivity. These platforms are not only cost-effective but also efficient in collaborative learning features.

C. Digital Workplace Impact on Performance Enhancement

Digital Workplace is an internet and web-based technologies are believed able to give a big impact on enhancing job performance. This type of technologies has exchanged the institutional knowledge by exchanging communication system in working culture and increase the productivity and efficiency. Therefore, it gives benefit for all workers including the disabled worker as they are able to do their job at home [5].

Knowledge management (KM) is an efficient process of capturing the various form of knowledge experience for future use to enhance decision making. KM is considered a necessity for organizations. It is important for an organization to understand how their employee react to collaboration management and governance activities [40]. The digital workplace can elevate the existing KM as it can reduce the operation cost and encourage creating new product development in an organization [53]. One of the ways is, an organization can reward the employee as a booster to encourage the team member and nurture knowledge sharing among the community by giving rating or level of the member according to how many posts have been made. This can be done by utilizing the features in digital workplace Web which can be accessed by all employees.

The use of digital technology boosts innovation in an organization where employees creating ideas and implement these ideas in the organization. Therefore, it gives benefit to the organization to upgrading and improves its the credibility and performance. The development usage of ICT has immersed among academicians. The arrival of new online technologies such as social media technologies provides opportunities to academicians to adapt and customize the ICT tools for various useful means. The adoption of these tools not only serves the purpose of information and knowledge sharing but also boost more flexible, committed and motivating learning among academicians [54].

III. METHODOLOGY

This study scope is a public research university in Malaysia. The university was established in 1972 with core specialization in engineering, and science and technology. Until 2018, this university has 2,297 staff and 1,427 staff with PhD holders. Since then, the university has graduated 11,392 students at the first-degree level, and 13,780 students at postgraduate level with 3,312 PhD awarded. Although this university has been granted the research university status, it is found that there is a huge performance gap among faculties in obtaining the MyRA ranks. Therefore, this is the best opportunity to impart the idea of the digital workplace as one of the solutions in bridging this gap.

Two methods are used to achieve the aim of this paper, which is literature review and interview. In conducting a literature review, this study follows steps defined by [55] as depicted in Fig. 1.

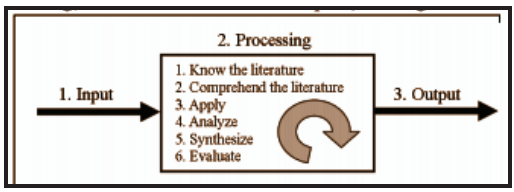

Fig. 1. Three stages of the effective literature review process (Levy & Ellis)

The process starts by knowing the literature then comprehend the literature whereby only literature that is significant or relevant will be taken for analyzing phase. The resource is synthesized according to the aims of the research area before evaluating by the domain expert for this research area. Therefore, this study follows as recommended by this writer in achieving digital workplace.

This study also conducted a series of interview with the personnel who are assigned to in charge of university research and the university's MyRA coordinator. The objective

of conducting the interview is for obtaining feedback from participants that are managing the university research and publications. This also includes seeking the view of participants on the main issues and lastly discovering factors that influencing the development of the digital workplace model. The result from the interview is merged with existing literature review findings and then is used as an input in developing a proposed model.

IV. PROPOSED CONCEPTUAL MODEL

A. Review of the Existing Related Models

There are limited models that are available in the current literature. The relevant literature was searched based on keyword knowledge sharing, "Knowledge Collaboration", "Knowledge Co-Creation", "Knowledge Management", "Collaboration Knowledge Management", "Digital Workplace" and 'Digital Library". Based on extensive review and analysis of the relevant literature, here are the six (6) related model as following:

M1: A Case Analysis of the Focus on the Maturity Model and Informations Technologies [56]
M2: Research on the Capability Maturity Model of Digital Library Knowledge Management [53]
M3: Digital Workplace Maturity Model [57]
M4: The Digital Maturity Model 4.0 [58]
M5: Introducing the Gartner Digital Government Maturity Model 2.0 [59]
M6: Digital Workplace: Self Assessment and Setting Priorities [60]

There are six related digital workplace models that serve various purposes. There are one collaborative knowledge sharing model, four digital workplace model and one knowledge management model. The selection of models in this study review is based on their scope and aim of the model that which can contribute to the development of this Digital Workplace Model for Research University Publication Collaboration. The comparison and analysis of each model are presented in Table I.

TABLE I. ANALYSIS OF EXISTING DIGITAL WORKPLACE MODELS

Code	Type	Model	Scope	Theory	Key Elements
M1	Digital Workplace Model	A Case Analysis On the Focus On The Maturity Model and Informations Technologies	Maturity models are based on the premises that people, organizations, functional areas, processes,	Capability Maturity Model (CMM)	-Requirement Management-Software quality -Organization process-Training program-Peer views-Technology change
M2	Knowledge Management Model	Research on the Capability Maturity Model of Digital Library Knowledge Management	Digital Library	Capability Maturity Model (CMM)	-Knowledge -Processing-Requirement Management-Credibility Awareness-Security-Quality-Librarian Training-Service-User profile-Technology
M3	Digital Workplace Model	Digital Workplace Maturity Model	Digital Workplace	Capability Maturity Model (CMM)	-Communication-Information-Community -Collaboration-Service-Structure-Benchmarking
M4	Digital Workplace Model	The Digital Maturity Model 4.0	Digital Maturity Model	Not Available	-Culture-Technology-Organization-Insight-Governance-Business-Strategy-Customer
M5	Collaborative Knowledge Sharing Model	Introducing the Gartner Digital Government Maturity Model 2.0	Digital Government Maturity	Not Available	-Value Focus-Service Model-Platform-Ecosystem-Leadership-Technology Focus-Key Metrics
M6	Digital Workplace Model	Digital Workplace Self Assessment and Setting Priorities	Digital workplace model	Not Available	-Leadership-Culture-Process-Structure-Reach-Enterprise-Business-Individual-Asset

B. Gaps Identified and Initial Findings

The main objective of comparing and analyzing the existing model is to capture and identify the suitable key elements for developing a digital workplace model for the university research publication. Table II summarizes all the key elements identified from the existing models.

TABLE II. ANALYSIS OF KEY ELEMENTS FROM THE EXISTING MODELS

No	Key Element	M1	M2	M3	M4	M5	M6
1.	Asset Monitoring						•
2.	Allow Benchmarking			•		•	
3.	Allow Collaboration			•			
4.	Multiple Communication Channel			•			
5.	Credibility Awareness		•				
6.	Collaborative Culture				•		•
7.	Dynamic Ecosystem					•	
8.	Enterprise-wide Implementation				•		•
9.	Clear Governance				•		
10.	Individual Personalization				•		•
11.	Information Governance			•			

12.	Additional Insight Provided				•		
13.	Require Leadership					•	•
14.	Organization process	•					
15.	Allow Peer views	•					
16.	Reliable Platform					•	
17.	Robust Processing						•
18.	Information Quality		•				
19.	Far Outreach						•
20.	Requirement Management	•	•				
21.	Strong Security		•				
22.	Provide Additional Services		•	•			
23.	Guaranteed Software Quality	•					
24.	Include Leadership Strategy				•		
25.	Provide System Architecture Structure			•			•
26.	Robust Technology			•	•	•	
27.	Include Training program	•	•				
28.	Highlight Value Focus					•	
	TOTAL	**5**	**6**	**7**	**7**	**6**	**8**

On the other hand, findings from the interviews with the university research manager and MyRA coordinator indicates that there are five dimensions that can be used to group these identified key elements. The dimensions defined are:

1. Omnichannel Communication (web-based and mobile)
2. Education Environment (designed according to university academic ecosystem)
3. Community Engagement (between research alliances, research groups, faculties etc.)
4. Dynamic Collaboration (academician, student and administrative staff)
5. Strategy (impart Key Performance Indicator (KPI) and Key Amal Indicator (KAI), top management strategy)

From the analysis done, there are three important elements absent in existing proposed models. Firstly, none of the models was designed for research university publication collaboration. Secondly, the existing models are not focusing on collaborating with technology elements for the community and thirdly, the existing models are the absence of standard elements and framework.

C. The New Proposed Model

The proposed Digital Workplace Model for Research University Publication Collaboration is formulated by three types of models namely, the Digital Workplace Model, Knowledge Management Model and Collaboration Knowledge Sharing Model. All the key elements are extracted from existing models and formulated into a new model as depicted in Fig. 2.

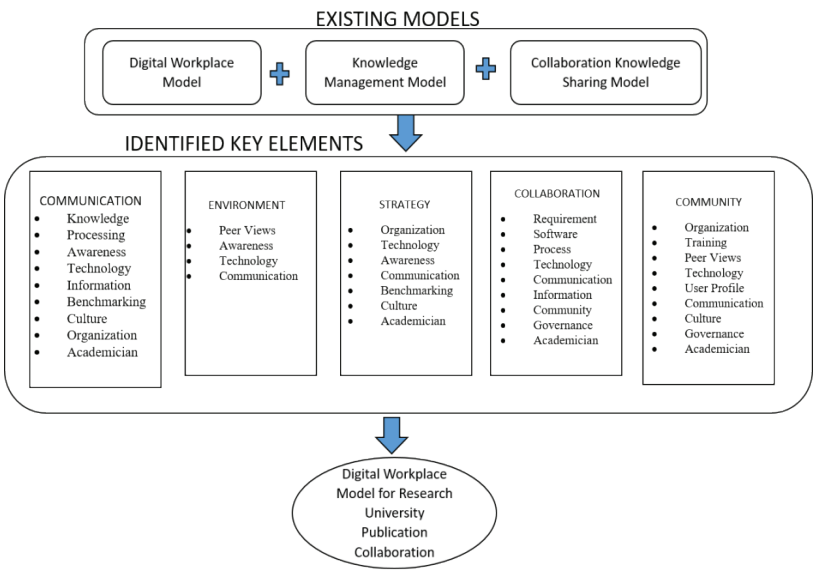

Fig 2. Proposed conceptual model

In the proposed model all the key elements identified are grouped into five dimensions, which are communication, environment, strategy, collaboration and community. Communication describes how the knowledge or digital workplace able to communicate with another system as well as people. Meanwhile, the environment is related to the situation and support from the university on the research publication. While strategy refers to how the university should think and plan ahead in sustaining the research university excellence. Same goes with collaboration, whereby a clear governance and mechanism should exist to support the digital workplace initiative. Finally, is the community which means the driver of this initiative which consists of the academician, researcher, support staff and other potential stakeholders.

V. CONCLUSION AND FUTURE WORKS

This paper describes the overall picture of Digital Workplace Model for Research University Publication Collaboration by focusing on key elements derives from the Digital Workplace Model, Knowledge Management Model and Collaboration Knowledge Sharing Model. As discussed, digital workplace provides five services or capabilities started with communication and employee engagement, secondly is collaboration among peers, thirdly sharing information and knowledge, fourth is applications use in business and lastly working agility where employee able to be productive at any time and space.

This study provides an analysis of six related models and surprisingly none of them is designed for research university publication and collaboration. In fact, existing key elements of these models also do not cater for collaboration and knowledge sharing on the active research working document. In future works, this proposed conceptual model will be evaluated and enhanced through the Delphi technique with the respondents amongst the university academic staff as well as another research collaborator. In addition, this study also will seek technological knowledge from the industry digital workplace technology experts.

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