DIGITAL TRANSFORMATION MODEL: THE STUDY OF THE GOVERNMENTAL AGENCY IN A DEVELOPING COUNTRY

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Abstract

Embracing digital transformation is imperative for governments seeking to enhance service delivery and improve their operational efficiency in the digital age (Chen et al., 2021; Velmurugan et al., 2022). This study investigates factors influencing the use of digital technology in operations and customer service within Thailand's Office of the Welfare Promotion Commission for Teachers and Educational Personnel (OTEP). Five key factors — attitude, tech literacy, organizational culture, leadership, and technology facilities — affect hardware, software, and data warehouse usage among OTEP staff. Data was collected through a questionnaire and analyzed using confirmatory factor analysis and structural equation modeling (SEM), revealing age-related differences. The findings indicate moderate digital technology readiness within OTEP, with a prevalent negative attitude toward data warehouse use among employees. Technology facilities, tech literacy, leadership, and organizational culture significantly impact digital technology utilization. However, for young OTEP employees, attitude, tech literacy, and leadership have no significant effect on data warehouse consumption. This underscores challenges in fostering human resource development, particularly in the digital technology realm, as the majority of government agency personnel in Thailand are of a certain age. Embracing digital technology is crucial for improving organizational performance, especially in large government agencies.

Keywords: Digital Technology, Digital Literacy, Government Agency, Digital Transformation, Structural Equation Modeling

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1. INTRODUCTION

Globalization is taking on a new form in the digital age, characterized by the proliferation of the Internet and mobile communication technologies, as well as advancements in digital technology and information and communication technology (ICT). The computer and other innovative ICTs are critical technological features of this new era of globalization, connecting the world into a unified communication system and generating a cohesive financial and information landscape (Jangjarat et al., 2023; Limna, Kraiwanit, & Jangjarat, 2023; Limna, Kraiwanit, Jangjarat, Klayklung, et al., 2023). To reap the benefits of Industry 4.0, digital transformation and technology are now an unavoidable measure in all industries (Ray

& Pareek, 2023; Velmurugan et al., 2022). It is impossible to exaggerate the importance of digital transformation's role in transforming bureaucratic and organizational culture as well as increasing stakeholder participation (Mergel et al., 2019). Digital transformation is a strategic requirement for governments to improve service performance, customer experience, operations, and revenue (Mergel et al., 2018). Digital transformation is a strategic imperative for governments to improve service performance, improve customer experience, streamline operations, and generate new income. Examples include the European Union (EU) eGovernment Action Plan, Digital Government Strategy, and Internet Plus Government Services (Curtis, 2019; CIO.gov, 2012; The General Office of the Central Committee of the CPC & the General Office of the State Council, 2016; Calthorpe et al., 2020; European Union, 2016; Fitzgerald et al., 2014; Lazar et al., 2020). The capacity to adjust to increasingly digital forms of technology is very necessary for the growth and progression of businesses and other types of organizations (Bican & Brem, 2020; Rahmatullah et al., 2020). Several stages of digital transformation are now taking place around the world. The government of Thailand, similar to those of other nations, devised a plan in 2016 called Thailand 4.0 with the goals of "stability, prosperity, and sustainability" (Ministry of Industry, 2016; Office of National Higher Education Science Research and Innovation Policy Council, 2022; Puriwat & Tripopsakul, 2020). Thailand 4.0 aims to speed up national reform to prepare for the twenty-first century, leveraging digital technology to achieve wealth and long-term viability.

In this research, the Office of the Welfare Promotion Commission for Teachers and Educational Personnel (OTEP) serves as a case study for further examination. OTEP's administrative offices are located in Bangkok, Thailand, and it has sub-branches in every province. The total number of employees at OTEP is 777 people. The objective of OTEP is to provide financial assistance to educators and instructors in the form of grants, loans, fees for professional development, care for the elderly, and bereavement payments. The purpose of these services is to provide assistance to members, beginning on their first day of employment and continuing until either they leave the organization or pass away. It is possible that an individual will put in at least 60 years of service. The OTEP currently has more than one million members all over Thailand. In order to deliver valuable services to its members in an efficient manner, it is essential to make use of digital technology at both the management and service levels. Yet, making the shift from a bureaucratic organization to one that is relatively modern, adaptable, and technologically efficient is not a simple task. In spite of the fact that digital transformation is actively encouraged by government policy across the country (Industry 4.0), the process of reforming any organization is a lengthy one that needs major assistance in the form of financial investment and a shift in mentality. In today's digital era, OTEP, just like any other governmental agency in Thailand or anywhere else in the world, is responding to these changes and is still being forced to reform itself in order to fulfill the service demands of the citizens.

While numerous studies have delved into the realm of digital transformation, some notable examples include Melitski et al. (2010) examining technology adoption and organizational culture in public organizations, and Lazar et al. (2020) exploring the scale of digital technology adoption in the context of blended learning within higher education. Despite these valuable contributions to the field, a distinct gap exists when it comes to understanding the fundamental factors that underpin the adoption of digital technology in operational systems and customer service specifically within the OTEP, a prominent Thai government agency. This study, therefore, seeks to fill this critical gap by delving into the influential factors shaping the utilization of digital technology within OTEP. It presents a substantial contribution to the field of digital transformation in government entities by meticulously identifying and scrutinizing five pivotal factors: 1) individual attitudes, 2) technological literacy, 3) organizational culture, 4) leadership qualities, and 5) the state of technological infrastructure. The findings of this research may offer a comprehensive understanding of how these factors impact both the performance of hardware, software, and data warehouse consumption by OTEP personnel and the broader implications for operational efficiency and service delivery. Furthermore, by employing quantitative methods such as confirmatory factor analysis and structural equation modeling (SEM), this study may provide a robust foundation for decision-making in the context of digital transformation. Additionally, the investigation of age-related differences in these factors sheds light on the unique challenges faced by government agencies with a diverse workforce. Ultimately, this study equips decision-makers, policymakers, as well as other stakeholders, with valuable insights to enhance their organization's digital readiness, improve performance, and navigate the complexities of digital technology adoption in the public sector.

The paper consists of six sections. Section 1 introduces the study. Section 2 provides the literature review. Section 3 describes the research methodology. Section 4 presents the results. Section 5 presents the discussion. Section 6 includes conclusions, limitations, and recommendations.

2. LITERATURE REVIEW

Human behavior is studied through theories that explore the underlying causes and implications for individual attitudes. These include preparedness to embrace advanced technology, adoption of mobile operating systems, and acquisition of information systems. Individual intention theories rely heavily on human psychology as their foundation. The theory of reasoned action (TRA) developed by Ajzen and Fishbein (1975) investigates the relationship between attitudes and behavior in human action and attempts to predict a person's behavior based on their pre-existing attitudes and behavioral intentions. The theory of planned behavior (TPB) is an important theory that explores cognitive elements of self-regulation and self-behavior, whereas Ajzen (2011) posits that individuals feel in control when they have the resources and opportunity to engage in activities. People feel in control of their time when they decide how to spend it, and when they have access to the resources they require, they are more likely to accept new career opportunities. In addition, there is a theory within the field of information systems known as the technology acceptance model (TAM), which defines how clients acquire and use new technology. The TAM focuses on the elements that influence the adoption of a new technology or innovation. Individual attitudes may be influenced by the perceived ease of use (PEOU) and the perceived degree of utility (PU), two qualities that have a direct impact on an individual (Herzallah & Mukhtar, 2016; Limna, Kraiwanit, & Jangjarat, 2023). Such criteria include readiness to adopt sophisticated technologies, adoption of mobile operating systems, and enterprises' acquisition of information systems. Individual intention theories are largely grounded in human psychology. The TRA by Ajzen and Fishbein (1975) examines the connection between attitudes and behavior in human activity. Ajzen (2011) developed this social psychology theory, which asserts that a person feels in control when they have the necessary resources and opportunities to engage in particular activities. Specifically, the theory asserts that a person feels in control when they are able to make decisions about how they spend their time. To put it another way, people's willingness to take up new employment opportunities increases when they believe they have access to the necessary resources. In addition, these models suggest that age has a substantial impact on one's ability to interpret behavior about the acceptance or rejection of technological advances. There has been a significant amount of success in applying the TRA, TPB, and TAM theories in the quest to better understand the behavior of consumers in relation to new technology. In every corner of the globe, both private businesses and government agencies are rapidly adopting and extending their use of technological innovation. Government agencies interact with many parties such as with consumers (G2C), businesses (G2B), and governments (G2G) (Joia, 2004; Putri, 2022). All governments must deal with "e-government" as part of their transformation. It promotes transparency, accountability, and government (Simintiras et al., 2014). Reforms of this nature make governments more focused on achieving results, more efficient, and more involved with the people they serve. The important success variables for technology adoption and readiness have been the subject of much research. These factors include user age, knowledge, and attitudes, all of which have the potential to influence technology readiness either favorably or negatively. A company's ability to adapt to new technologies depends on a number of factors, including its corporate culture, its leadership and management, and the organization's learning facility, among other things. In this investigation, we categorize the factors influencing an organization to leverage advanced technologies into two main categories: 1) individual and 2) organizational characteristics. These criteria are essential for evaluating the organization's readiness for digital transformation. At the individual level, we are concerned with the attitude of each member towards the organization's digital readiness, as well as their digital competencies that are beneficial in preparing the organization for digital transformation. At the organizational level, the study also investigates the organization's readiness to adopt digital transformation by considering many factors such as culture, leadership, and resources at a holistic level. The dependent variable, which measures the level of digital readiness inside the organization, is divided into three independent components: 1) hardware (Y1), 2) software (Y2), and 3) data warehouse (Y3). These aspects collectively constitute the foundation of the organization's capacity to adopt and leverage digital technologies. Hardware (Y1) refers to tangible technological resources, software (Y2) encompasses the applications and digital platforms being utilized, and data warehouse (Y3) centers around the organization's approaches to storing, organizing, and managing digital data.

2.1. Individual level

The focal factors in this paper are at the individual level, including the attitude of the staff who work in the organization and staff knowledge regarding technology, considering whether they have sufficient and broad knowledge about technology. The self-perception theory, an alternative explanation for cognitive dissonance, was proposed for the first time in 1967. According to this theory, certain circumstances can cause an individual to develop self-described attitudes that are the result of the individual observing their own behaviors (Bem, 1967). Attitude and subjective norms are significant factors in the development of behavioral intentions. According to the TRA, an individual's beliefs are what drive their attitudes, which in turn impact their intentions, which ultimately shape their conduct. According to Davis (1989), one of the elements that contribute to the adoption of information technology is what is known as "perceived usefulness". Another important factor that influences an information system's acceptability is its ease of use. The term "perceived ease of use" refers to the degree to which an individual believes that making use of an information system is effortless and does not require any kind of mental exertion on their part (Lu et al., 2003). People who have a positive attitude toward technology have a greater chance of being happy with the system and reaping the benefits of using it (Kocsis et al., 2022). As a consequence of this, it is anticipated that the attitude of the user will have a favorable influence on both PU and behavioral intention. Thanarithiporn (2004) used the TAM model to analyze the attitudes and behaviors of Thai mobile phone users. He found that advertising media had a substantial impact on users' views as well as their behavior towards mobile phone usage. PEOU, benefit acceptance, and mobile service quality were found to be the most important factors in the adoption of mobile applications by Puriwat and Tripopsakul (2017) after they investigated 348 samples of mobile banking apps using the TAM and the mobile service quality (MSQ) model. As a result, the hypothesis is formulated with consideration for the ideas and findings of prior research.

H1: Attitude is a key factor correlated with digital technology readiness.

In order to get an understanding of the relationship between technological expertise and preparedness for digital technology, consideration is given to the connection between self-efficacy theory and computer self-efficacy (CSE). Computer self-efficacy relates to an individual's impression of their skills in terms of utilizing computers in a variety of settings, whereas self-efficacy theory focuses on people's perceptions of their capacity to plan and take action in order to achieve a certain objective (Hamann et al., 2023). Both of these theories are essential for people to understand before they can take action to improve their computer literacy. Individuals need to recognize their capabilities and take action in order to learn, improve their skills, and increase their knowledge. The ability to use computers is not an exception. Levels of literacy often start at the fundamental level and go all the way up to the intermediate and advanced levels. As a direct consequence of this, experience and digital literacy are intricately interconnected (Kendrick et al., 2022). Digital technical literacy covers computer office software, email, social media, digital media, storage, online form development, and big data. Technology skills include using computer office programs, social media, social media platforms, communication apps, cloud storage, and big data analysis. According to this, the following technical literacy hypothesis may be established, which indicates that participants in this study have knowledge of technology. It is hypothesized that the level of technological knowledge an organization holds has a direct and positive effect on its readiness to adopt digital technologies. Therefore, it is anticipated that technological expertise has a large and positive effect on the digital technology readiness of an organization.

H2: Tech knowledge is a key factor correlated with digital technology readiness.

2.2. Organizational level

Culture is an essential component of every organization, although there is no universal definition of culture. According to Schein (2010), organizational culture is a pattern of shared basic assumptions that are learned by a group. Clan culture, adhocracy culture, competitive culture, and hierarchical culture, often known as "control culture", are the four different types of organizational cultures. Clan culture is also known as "collaborative culture" (Cameron & Quinn, 2011; Gimenez-Espin et al., 2013). The organizational culture of a company impacts how that company and its employees take in information, how they learn, and how they become ready for new information. The degree to which a company is technologically advanced is heavily dependent on the way in which its personnel see technology. This, in turn, is impacted by the culture of the organizations. This research delves deeper into three more factors: company culture, leadership, and facility support.

The incorporation of new technologies tends to go hand in hand with the development of corporate culture to some extent. It has become more important for organizations to adopt and make effective use of information technology as a means of achieving their goals in light of the increasingly dynamic, networked, and decentralized environment in which they operate. Melitski et al. (2010) conducted research on behavioral intent theory, technology adoption theory, and organizational culture. Based on their findings, they proposed a methodology for analyzing technology acceptance in public companies. A study focusing on the roles of organizational learning culture and transformational leadership and employee performance is also studied and it is found that transformational leadership is significantly associated with both employee performance and organizational learning culture (Udin, 2023). In this study, the role of organizational learning culture as a mediator and moderator variable between transformational leadership and employee performance is formed. This current study therefore examines how organizational culture affects technology adoption, and suggests the following hypothesis.

H3: Organizational culture is a key factor correlated with the OTEP's digital technology readiness.

Leadership is one of the most complicated and multifaceted phenomena studied in organizational and psychological contexts (Cortellazzo et al., 2019). In order to create an evolutionary tree of leadership theory and illustrate the path that it has traveled, an evolutionary developmental approach is utilized (Zhao et al., 2023). The majority of the world's most successful businesses make it a priority to ensure that their highest-ranking leaders, particularly executives' levels. The implementation of their suggestions might provide a company with an advantage in the market by creating and delivering value over the long term (Borkovich et al., 2015). According to Khang et al. (2023), the success of businesses is not just attributable to the technology that they use but also to the level of leadership, communication, and planning abilities, as well as interpersonal skills, possessed by their managers. According to Torre and Sarti (2020), having strong leaders within an organization is absolutely necessary in order to improve its technological preparation. Because of this, there is a potential challenge associated with changing the culture of the organization. Leaders that have a good understanding of digital technology have the ability to improve an organization's data warehousing capabilities while also making it possible to carry out more effective operations. The hypothesis below is stated.

H4: Leadership is a key factor correlated with digital technology readiness.

Educational resources that are easily accessible are necessary for the preparedness of organizations (Bonanno et al., 2011). Also, it is contingent on a variety of operational elements, such as the level of expertise and technological aptitude possessed by workers. Adoption of digital technology also relies heavily on ready access to suitable resources (Player-Koro, 2012), access to facilities allows people to be knowledgeable and able to provide better services (Shonhe, 2019). Thus, it is essential for anyone to have access to technological facilities. It is hypothesized as follows.

H5: Accessible and sufficient technological facilities are a key factor correlated with digital technology readiness.

However, one prevalent challenge for governmental organizations in Thailand is that the people who work in the government sector are typically not young. Unskilled employees have a higher tendency to remain in their positions for longer periods of time than younger and more skilled employees. They have a work ethic, expertise in organization, and network connections, but the technological gap between senior and junior employees is fairly difficult to bridge (Finkelstein et al., 2022). The digital gap between younger and older generations has been a focus of several studies since the past to present time (Bailey & Ngwenyama, 2010; Iranmanesh & Onur, 2022; Phonthanukitithaworn et al., 2022; Subramanian, 2017). According to these findings, there is an urgent requirement to address the technological generational gaps. To this day, the findings of the vast majority of research indicate that the generation gap is still an issue. The age difference between individuals is an important factor in determining how well seniors can adapt to new digital technologies. The final hypothesis is explained in the following statement.

H6: Generation-age groups present different influences on digital technology readiness.

3. METHODOLOGY

3.1. Study population and number of respondents

The total number of people working for OTEP as of the date the data was collected was 777, which corresponds to the whole population of OTEP. Total respondents to the questionnaire were 527 people — about 70%. The participants consisted of a majority of females, around 76.9%, with only 23.1% being male. The ages of those who participated in the survey ranged from a young adulthood of 21 years to a senior age of 69 years, with a mean age of 42 years. Of the 527 respondents, there were 54 baby boomers (10.2%), 264 in generation X (50.1%), 192 in generation Y (36.4%), and 17 in generation Z (3.2%). For the amount of time spent working, the range was from less than one year up to 46 years, with 11 years of experience being the norm. The junior executives comprised the majority of the responders (63.9% of the total). The majority of respondents had a bachelor's degree, with 79.80% holding one in the fields of business administration, management, marketing, or accounting. In addition, more than 57% of the respondents were employed by OTEP at one of its provincial offices.

3.2. Research methods

In this study, a questionnaire consisting of 57 items was used to collect data. The respondents were asked and assessed themselves on questions regarding their attitude, digital literacy, organizational cultures, leadership, and technology facilities at their department in OTEP. They were also asked to evaluate themselves with regard to the level of preparedness of OTEP's digital technology in three dimensions, specifically hardware, software, and data warehouse. Using the Likert scale, a score of one indicates "least used", "never used", or "strongly disagree", while a score of five indicates "most used", "frequently used", or "strongly agree". The reliability of the questionnaire was assessed using the input of thirty different respondents who participated in a pilot test. In order to determine the internal reliability of each variable dimension, Cronbach's alpha is used. According to Brown (2009), a Cronbach's alpha of 0.70 or higher is considered to be the most reliable, and this value will serve as the inclusion threshold for that variable dimension in this study. In order to provide a response to the predetermined hypotheses, the statistical method of structural equation modeling (SEM) was utilized for variable and model selection.

3.3. Variables used in this study

The variables that were utilized in this research were categorized into five independent factors (*X1–X5*) and one dependent variable (*Y*), which was determined by the participant's level of preparedness with regard to digital technology. Table 1 provides a definition for each of the variables as well as the number of items that comprise each variable. It also provides the Cronbach's alpha value.

Table 1. Variables used in the present study

Variable	*Variable name*	*Description*	*No. of items*	*Cronbach's alpha*
X1	*Attitude*	Opinions on whether or not the use of digital technology is preferred or disliked.	6	0.918
X2	*Tech knowledge*	The level of familiarity of employees with the functioning of fundamental organizational processes.	9	0.926
X3	*Organizational culture*	Behaviors pertinent to transformation and adaptation.	3	0.794
X4	*Leadership*	The capacity of leaders to guide and support employees and other members of the organization.	3	0.915
X5	*Technical facilities*	Resources for learning that can enhance one's knowledge and skills in digital technology.	3	0.919
Y = Digital technology readiness		The organization's level of digital technology is classified into three levels, namely *hardware (Y1)*, *software (Y2)*, and *data warehouse (Y3)*.		
Y1	*Hardware*	The availability of sufficient hardware, both in terms of quality and quantity.	2	0.917
Y2	*Software*	The availability of the software, in terms of both quantity and quality.	2	0.851
Y3	*Data warehouse*	Preparedness and availability of the organization's data warehouse for operation.	2	0.936

Source: Prepared by the authors.

Due to the objective of this study is to examine the factors that influence the digital technology readiness of the organization, several statistical methods can be used, namely the ordinary least square (OLS) method, and SEM. There are some limitations of using OLS. The study contains dependent variables (*Y1*, *Y2* and *Y3*). SEM can be used to deal with several dependent variables in the same time. Therefore, SEM is employed in this study. This powerful statistical technique can handle multiple and interrelated dependence relationships. The model allows us to integrate several dependent and independent variables and understand the direct and indirect effects among them. It tests these relationships simultaneously. Involving constructs and variables that are not directly observable (latent variables), SEM can model these latent constructs using multiple observed variables or indicators. With a variety of goodness-of-fit indices to evaluate how well the hypothesized model represents the data, SEM is therefore selected to be employed in this study.

According to Flache et al. (2017), empirically based computational social influence models have the potential to contribute to a more robust understanding of important societal concerns. In many SEM software programs, the maximum likelihood (ML) estimation method serves as the default way to estimate. All of the estimation techniques relied on ML, which requires normal distribution or multivariate normality, continuous variables, and no missing data over 5% (Hoyle, 2011; Kline, 2015). Nevertheless, these requirements often overlook either the raw data or the quality of the data completely. Several papers make a cursory reference to multivariate normality, but very few go into detail about how to carry out data screening and/or transformation. The technique of partial least squares, which is in SEM, does not require continuous data or multivariate normality in order to be carried out. Report of model fit indices are in the form of statistical measures namely the comparative fit index (CFI), the root mean square error of approximation (RMSEA), the Tucker–Lewis index (TLI), the goodness of fit (GFI), the normed fit index (NFI), the standardized root mean square residual (SRMR), Akaike's information criterion (AIC), and the Bayesian information criterion (BIC) (several researchers used these indices in their research, for example Naqvi et al. (2018) and Schermelleh-Engel et al. (2003)). Model efficacy may be adequately assessed through the use of model fit indices (Barrett, 2007).

4. RESULTS

The results of the descriptive analysis are presented in Table 2, together with their standard deviations, means, and correlation coefficients (exogenous, *X1* to *X5*; endogenous, *Y1* to *Y3*). Table 2 displays the average rating scale given by respondents on a scale of 1 to 5. The respondents had a favorable *attitude* (*X1*) toward technology, which received a mean score of 3.83, but their level of *technological knowledge* (*X2*) received the mean score with the lowest value, which was 2.84. OTEP is only somewhat mediocre in terms of its technological readiness. The mean score for *hardware readiness* (*Y1*) is 3.21, which is the highest score possible.

Each cell in the table contains an illustration of the relationship that exists between the variables. The data show, for instance, a strong correlation between *leadership* (*X4*) and *organizational culture* (*X3*), with a coefficient of 0.710 (p-value 0.01), and between *hardware* (*Y1*) and *software* (*Y2*), with a coefficient of 0.836 (p-value 0.01). There is not a strong association between any of the exogenous factors and any of the other exogenous variables. In addition to this, there is no variance inflation factor (VIF) that is higher than 3.0 (Hair et al. 2010). According to the statistics, the variables do not exhibit any signs of multicollinearity and can be included in the analysis.

Table 2. Mean, standard deviation, and correlation matrix

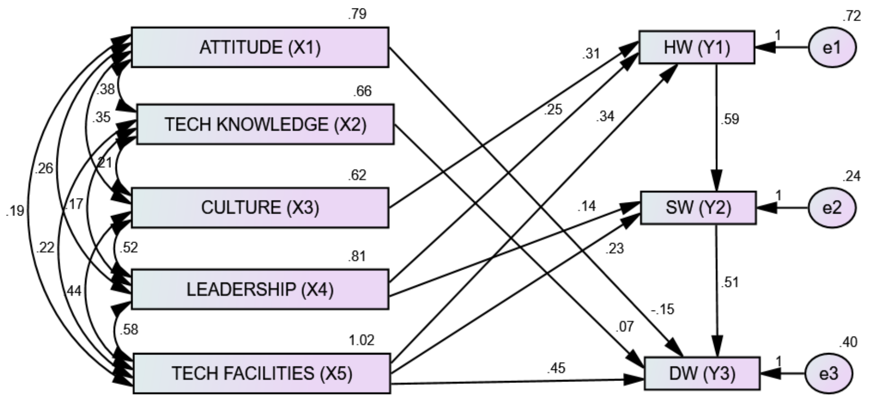
Variable		*Mean*	*STD*	*X1*	*X2*	*X3*	*X4*	*X5*	*Y1*	*Y2*	*Y3*
Attitude	***X1***	3.83	0.89	1							
Tech knowledge	***X2***	2.84	0.81	0.527**	1						
Culture	***X3***	3.62	0.79	0.492**	0.312**	1					
Leadership	***X4***	3.46	0.90	0.314**	0.200**	0.710**	1				
Techn. facilities	***X5***	2.89	1.01	0.203**	0.251**	0.535**	0.630**	1			
Hardware	***Y1***	3.21	1.10	0.197**	0.219**	0.523**	0.552**	0.558**	1		
Software	***Y2***	3.17	1.02	0.229**	0.240**	0.557**	0.625**	0.650**	0.836**	1	
Data warehouse	***Y3***	2.87	1.09	0.103*	0.222**	0.420**	0.509**	0.693**	0.607**	0.728**	1

*Note: n = 527, ** correlation is significant at the 0.01 level (2-tailed), and * significant at 0.05 level (2-tailed).*
Source: Prepared by the authors.

In order to determine the relationships between the variables and their effects, SEM is utilized. As can be seen in Figure 1, the subsequent model not only integrates and correlates all of the relevant aspects, but it also offers a structural relationship between the processes of the independent variables (*X1*–*X5*) and the dependent variables (*Y1*–*Y3*). The following metrics provide insight into the attained model fit estimation: 1) CMIN/df = 0.776 (CMIN = 6.207, df = 8); 2) GFI = 0.997; 3) NFI = 0.998; 4) IFI = 1.001; 5) CFI = 1.000; 6) RMSEA = 0.000. Finally, the results shown in Figure 1 shows that *technical facilities* (*X5*) have a highly significant influence (unstandardized regression weight = 0.45, p = 0.0001) on the *data warehouse* (*DW*; *Y3*), while the influence on *software* (*SW*; *Y2*) and *hardware* (*HW*; *Y1*) have coefficients of 0.23 and 0.34, respectively, with p-values of.0001. *The attitude* (*X1*) has a detrimental effect on the *DW* (*Y3*), meaning the respondents had a negative influence on *the data warehouse* (*Y3*). This finding is similar to several previous research (Nelson et al., 2005).

The state of *technical facilities* (*X5*) is the component that has the greatest impact on shifts in *HW* (*Y1*), *SW* (*Y2*), and *DW* (*Y3*), while errors of the observed variables are indicated unexplained variances and symbolic as e1, e2, and e3. Every variable in the model demonstrates statistical significance at the p-value of 0.000, with the exception of *technological knowledge* (*X2*), which demonstrates statistical significance at the p-value of 0.09, which corresponds to a confidence interval of 90%. According to Figure 1, the structural model appears to give a good fit to the data that is currently available and has the potential to function as an excellent model fit. In order for organizations to achieve progress toward their goals, it is vital for them to understand the links that exist within their processes.

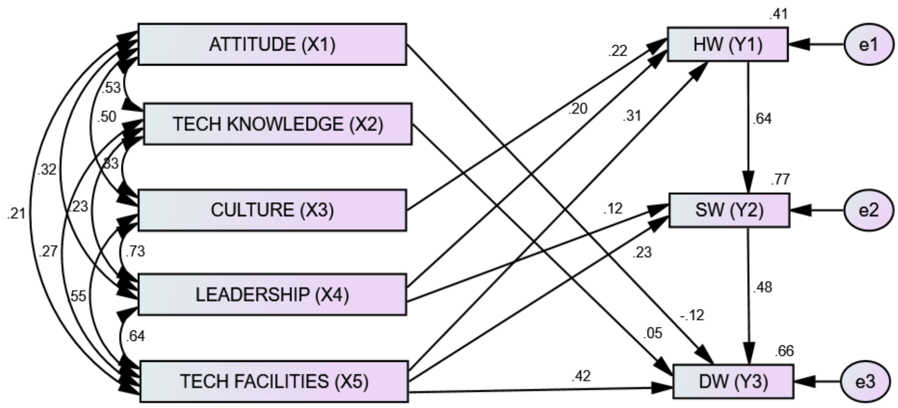
Figure 1. Unstandardized estimates of SEM (all groups)



Note: Chi-square = 6.207, df = 8, p = 0.624, Chi-square/df = 0.776, GFI = 0.997, NFI = 0.998, IFI = 1.001, CFI = 1.000, RMSEA = 0.000, Unstandardized estimates.
Source: Authors' calculations.

In the event that all other factors remain unchanged, the standardized estimates of the SEM are presented in Figure 2. The component that has the greatest impact on the variables on which they are dependent is *technical facilities* (*X5*). The organization needs to give comprehensive technological assistance in order to improve the hardware, software, and data warehouse. This will increase the readiness of the *hardware* (standardized regression weight 0.31), *software* (standardized regression weight 0.23), and *data warehouse* (standardized regression weight 0.33) (standardized regression weight 0.42). It is clear from examining Figure 2 that the technological facilities of the organization play an important part in determining how technological readiness is. The readiness of these three elements is what makes it possible for personnel to be operationally ready.

Figure 2. Standardized estimates of SEM (all groups)



Note: Chi-square = 6.207, df = 8, p = 0.624, Chi-square/df = 0.776, GFI = 0.997, NFI = 0.998, IFI = 1.001, CFI = 1.000, RMSEA = 0.000, Standardized estimates.
Source: Authors' calculations.

In this study, we investigate the age differential that exists between the two groups, as seen in Table 3. By employing SEM, we investigate the difficulties that arise from the generation gap with regard to the usage of information and communication technologies that arise from the generation gap with regards to the usage of information and communication technology. It has been discovered that the ratio of employees in their senior years (including baby boomers and members of generation X) to employees in their younger years (including members of generations Y and Z) is 60:40%. We employ multigroup SEM analysis to evaluate the cause and effect between these two groups. This is to ensure that the variations in structural connections identified across the conditions are not tainted by measurement mistakes or discrepancies in measurement (Her et al., 2019). Figures 3–6 provide the structural equation models for seniors and young age groups, respectively.

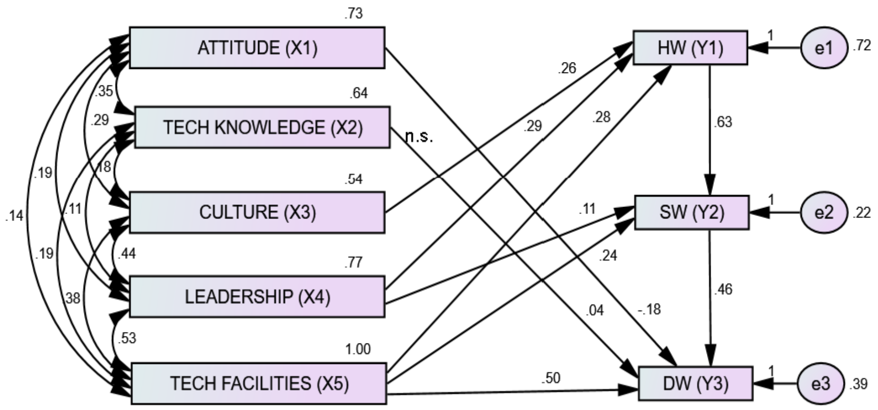
Table 3. Respondents classified by generation

Generation	*Total*	*%*	*Mean*	*Std. dev.*	*Age group*
Baby boomer	54	10.2	60.67	4.038	Senior n = 318 (60.3%)
X	264	50.1	44.62	4.504	
Y	192	36.4	33.54	3.602	Young n = 209 (39.6%)
Z	17	3.2	23.47	1.125	
Total	527	100.0			

Source: Prepared by the authors.

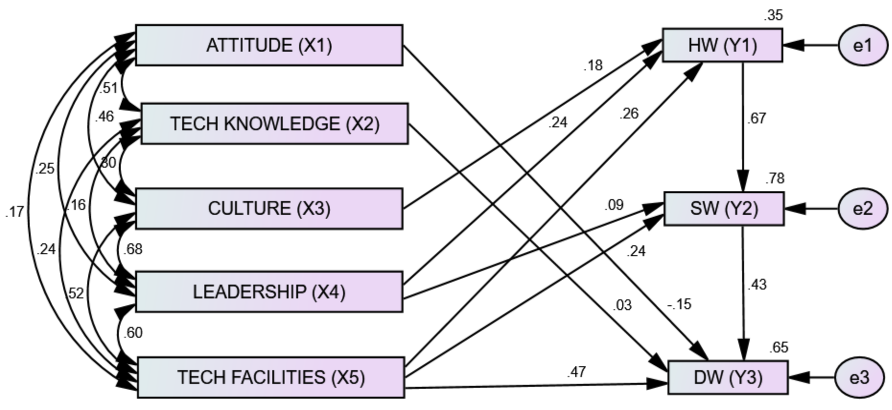
Figure 3 depicts the senior group, which follows a similar pattern to the all-group diagrams in Figures 1 and 2. All independent variables show a statistically significant correlation with the dependent variables at a 99.9% confidence interval (p-value = 0.00). However, one controversial path from attitude to data warehouse is negative. This means that the senior staff correlated negatively with employing the data warehouse. An interesting finding in the senior age group is that technological knowledge has no correlation with data warehouses. The diagram reports the statistical significance of *tech knowledge* (*X2*) to the *data warehouse* (*Y3*) (p-value = 0.402). The highest correlation is between tech facilities and data warehouses, which means that increased tech support will increase data warehouse readiness. In addition, there are strong correlations between the hardware, software, and data warehouse. This finding is common for technological readiness.

Figure 3. Unstandardized estimates of SEM (senior age group)



Note: Chi-square = 21.874, df = 16, p = 0.147, Chi-square/df = 1.367, GFI = 0.990, NFI = 0.992, IFI = 0.998, CFI = 0.998, RMSEA = 0.026. Unstandardized estimates, group = Senior age.
Source: Authors' calculations.

Figure 4. Standardized estimates of SEM (senior age group)



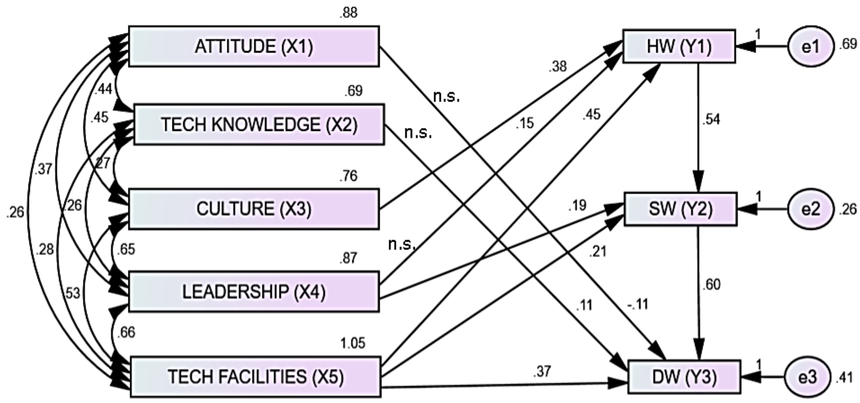
Note: Chi-square = 21.874, df = 16, p = 0.147, Chi-square/df = 1.367, GFI = 0.990, NFI = 0.992, IFI = 0.998, CFI = 0.998, RMSEA = 0.026. Standardized estimates, group = Senior age.
Source: Authors' calculations.

The models for both the senior age group and the young age group achieved stable model fit estimations: 1) CMIN/DF = 1.367 (CMIN = 21.874, df = 16); 2) p-value = 0.147; 3) GFI = 0.99; 4) NFI = 0.992; 5) IFI = 0.998; 6) CFI = 0.998; 7) RMSEA = 0.026.

The diagrams presented in Figures 5 and 6 illustrate the young age group, which show similar directions to the all-group diagram and senior diagram but at a different level of significance. *Technical facilities* (*X5*) still play a significant role in technology readiness, presenting 0.45 unstandardized regression weight (0.39 standardized estimate) to *hardware* readiness (*Y1*), 0.21 unstandardized (0.21 standardized estimate) to *software* (*Y2*), and 0.37 unstandardized (0.33

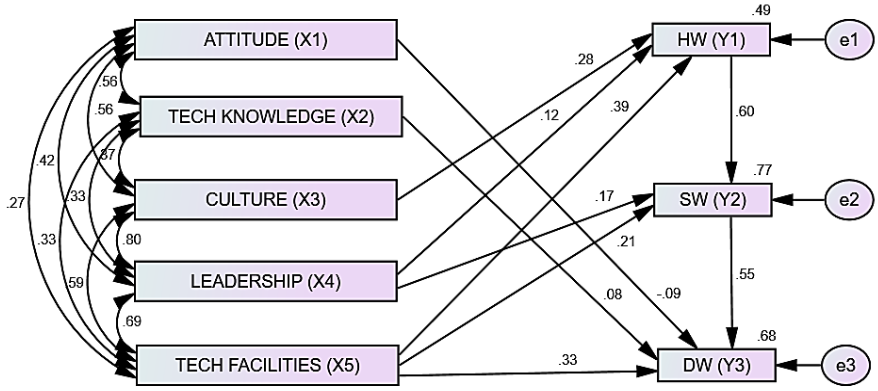
standardized estimate) to the *data warehouse* (*Y3*). However, there are three paths that present statistically insignificant regression weights: 1) *leadership* (*X4*) to *hardware* (*Y1*), 2) *tech knowledge* (*X2*) to *data warehouse* (*Y3*), and 3) *attitude* (*X1*) to *data warehouse* (*Y3*) were found not to be statistically significant, with p-values of 0.197, 0.093, and 0.056, respectively.

Figure 5. Unstandardized estimates of SEM (young age group)



Note: Chi-square = 21.874, df = 16, p = 0.147, Chi-square/df = 1.367, GFI = 0.990, NFI = 0.992, IFI = 0.998, CFI = 0.998, RMSEA = 0.026. Unstandardized estimates, group = Young age.
Source: Authors' calculations.

Figure 6. Standardized estimates of SEM (young age group)



Note: Chi-square = 21.874, df = 16, p = 0.147, Chi-square/df = 1.367, GFI = 0.990, NFI = 0.992, IFI = 0.998, CFI = 0.998, RMSEA = 0.026. Standardized estimates, group = Young age.
Source: Authors' calculations.

5. DISCUSSIONS

The level of technical readiness at OTEP was somewhere between moderate and low. The SEM analysis demonstrated that the explanatory variables have a substantial impact, with a higher cut-off for GFI (> 0.95) and RMSEA (0.08). This indicates that there is a meaningful relationship between the two. The findings indicate that the explanatory variables, including *attitude* (*H1*), *technological knowledge* (*H2*), *culture* (*H3*), *leadership* (*H1*), and *technological facilities* (*H5*), exhibit substantial associations with technological preparedness. This preparedness is measured by *hardware* (*Y1*), *software* (*Y2*), and a *data warehouse* (*Y3*), aligning with previous studies conducted by Fitzgerald et al. (2014), Cortellazzo et al. (2019), and Udin (2023). Furthermore, the degree of technical preparation in the *hardware* readiness dimension (*Y1*) is the highest among other dimensions, although it is still at a very low level. These findings are in accordance with the previous research conducted by Terdpaopong and Kraiwanit (2021). When applying SEM, it becomes evident that *technical facilities* (*X5*) play the most critical role in shaping OTEP's technological readiness, especially concerning *data warehouses* (*Y3*). The most noteworthy revelation from this model, encompassing the entire sample, is the negative attitude held by OTEP employees toward data warehouses. This finding could stem from the challenges associated with comprehending data warehousing as well as insufficient skills and experience among the staff in this domain. In addition, it was discerned that the quality of technical support for data warehouses is subpar. An interesting discovery is that there is no statistically significant association between the senior age group's technological expertise (*X2*) and the *data warehouse* (*Y3*), denoted as "n.s." on the path from *X2* to *Y3*. For the young age group, two additional non-significant paths were observed: 1) one from *attitude* (*X1*) to *data warehouse* (*Y3*) and 2) the other from *leadership* (*X2*) to *hardware* (*Y1*).

6. CONCLUSION

The results of this study shed light on the various ways in which OTEP's preparedness for the implementation of digital technology might be improved. The tech facility has the greatest impact on the degree to which the organization is prepared to utilize digital technology. On the other hand, boosting only one primary element might not be enough to totally raise the degree of preparedness. If the other considerations were taken into account, OTEP's preparedness for digital technology would be significantly improved. Because the technological facility is the most important component, it is imperative that additional educational facilities be constructed, that employees be encouraged to engage in lifelong education, and that adequate educational resources be made available. In addition, we strongly advise that employees receive training in digital technology so that not only their literacy levels but also their experience levels may be increased. In addition, OTEP can encourage sustainable learning, such as quick online training courses to engage the staff in self-directed education. OTEP ought to promote ongoing self-learning, and as part of their yearly performance review, they need to establish key performance indicators for training. The readiness of the organization's facilities is critical for supporting the organization's operations. Even though there have been studies regarding the relationship between technology adoption with human resource competencies and management, most of the studies are based on private organizations (Penpokai et al., 2023; Nankervis & Cameron, 2023). At the same time, it is necessary to have a backup system in order to save all of the data. In order to maintain the integrity of the data, this backup system must incorporate not just a data warehousing system but also a firewall system. This is important either for governmental agencies or private industry (Baqleh & Alateeq, 2023). If any of them are developed, they will improve OTEP to be in the digitalization era. It is evident that the technological expertise of senior staff members has to be upgraded. This is true for staff members of a younger age as well. This could mean that they are not really relying on the organization's hardware when making personal or professional use of devices.

While this study sheds light on the factors influencing digital technology adoption within Thailand's Office of the OTEP, it is essential to acknowledge its limitations. Generalizability to other government agencies or diverse cultural contexts may be challenging due to the specific nature of the OTEP case. The use of self-reported questionnaire data and the cross-sectional approach, while informative, leave room for bias and the inability to capture the dynamic nature of technology adoption over time. Furthermore, while the study explores age-related differences, it does not delve deeply into the unique challenges faced by younger and older employees. To advance the field of digital transformation in government organizations, future studies should consider cross-cultural research, employ longitudinal data, utilize mixed-methods approaches, address age-specific challenges, and benchmark OTEP against other agencies. These endeavors will provide a more comprehensive understanding of digital transformation's nuances and contribute to the development of tailored strategies for enhanced service delivery and operational efficiency in the digital age.

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