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Factors Influencing the Digital Transformation of Universities in Thailand

Chanchira Laorach[1], Kulthida Tuamsuk[2*]

[1,2]*Department of Information Science, Faculty of Humanities and Social Sciences, Khon Kaen University, Thailand.*

* Corresponding author: Kulthida Tuamsuk (*Email: kultua@kku.ac.th*)

Abstract

Rapid advances in digital technology have brought about changes in the administration and operations of all kinds of organizations. Those that are able to efficiently transform themselves into digital organizations in a short time and have a high capacity for self-adjustment to the new socio-economic situation achieve competitive advantages. Many universities in Thailand have committed to a strategy of transformation into digital organizations. This research was conducted to study the factors behind the success of the digital transformation of Thai universities, using a quantitative research method. The data were collected using a questionnaire administered to 495 administrators from 6 Thai universities, of whom 303 were high-level administrators, 174 middle-level administrators, and 18 low-level administrators. Statistical analyses and confirmatory factor analysis were performed on the data obtained. The results revealed 6 factors that influence the success of digital transformation in the context of Thai universities: 1) digital culture, 2) digital strategies, 3) management process, 4) organization leaders, 5) digital technologies, and 6) staff. The results are useful for academics and organizations' administrators or authorities to set clearer directions to propel their operations towards digital success.

Keywords: Digital transformation, Success factors, Digital organization, University transformation, Digital technology, Thailand.

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1. Introduction

The concept of digital transformation is of great interest to the world's organizations and agencies, especially business organizations [1], due to the rapid developments in digital technology that have affected all sectors. Many organizations have become aware of the need for transformation in order to face various forms of competition. Digital transformation is considered a strategic change that involves automatically integrating digital technologies with every aspect of an organization, covering its infrastructure, operational patterns, products, services, and other processes. Technologically advanced organizations display creative, rapid, and streamlined compilation, information analysis and utilization for value addition, and the prioritization of the customer experience [2].

Developing and utilizing modern technologies has thus become an important element for both private and governmental organizations for the purpose of transforming their operations and implementing upgrades [3]. As a consequence, the trend of transforming into a digital organization has become popular. Reviews of related literature show that, at present, several worldwide organizations are accepted as digital organizations, for example, Amazon, Google, Netflix, Uber, Airbnb, etc. [4]. Moreover, in 2018 Dell Technology conducted a survey on world organizations' progress towards digital transformation and showed that those in the digital leader category had broadly carried out digital reform, and the category accounted for 5% of all organizations in the world. In Thailand, roughly 7% of organizations can be categorized in the digital leader category, and most of these are private [5].

Meanwhile, academic institutions represent another sector that has been impacted by modern technologies and is at risk of stoppage due to digital disruption. Previous, non-digital, educational approaches might not be able to meet the needs of learners. Students do not need to come to study at a university but can attend short courses or online instruction offered by different institutions that teach them new and necessary skills for their occupations. As a result, the number of college students is continually decreasing. In addition, technologies have led to changes in teaching. Teachers are no longer only university lecturers. Learners can learn from experts in small institutions that cater to specific fields, demonstrating integration between the cyber world and the physical world, which in turn impacts the instructional approaches [3, 4, 6]. Universities have become aware of the importance of this impact and have urgently carried out organizational transformation to be able to adjust themselves in time to the present world's development and competition [1].

Nevertheless, a large number of organizations are confronting a situation in which they need to achieve rapid transformation. Thus, the digital transformation of organizations is a priority to be aware of [7]. This transformation not only concerns investment in information technologies, digital equipment, and modern hardware and software, but also the revision and adjustment of the organization's operating concepts, which might principally have to take into account the demands of consumers rather than focusing on products or rivals. The revision of value chains will enable an organization to realize whether the business is at the point of competitive competence, where rivals cannot intervene, and can adjust whenever required. In addition, an organization also needs to enhance the digital skills of personnel and administrators and build understanding to transform their thinking process towards digital impacts, in terms of concepts, vision, and increased confidence of all levels of personnel in the organization. This will ultimately lead to an organization with a digital culture [4].

A review of related literature and research studies revealed that, in general, the factors behind digital transformation have only been studied in the context of private organizations. No factors have yet been identified that directly impact academic institutions in Thailand. This research study, therefore, aims to discover the factors that affect digital transformation in the context of Thai universities to broaden the scope of knowledge related to the factors behind digital organizational transformation. The results can be used for the development of policies to further the clear and correct transformation of institutions into digital universities. The outcomes will benefit researchers, academics, leaders, and those in charge of transforming digital organizations, helping them to carry out their work with success and quality.

2. Literature Review

Thai universities are academic institutions under the Ministry of Higher Education, Science, Research and Innovation, with the principal mission of preparing a labor force with the expected standards. This mission is in line with the national requirements for socio-economic development, academic services, research, and studies for the development and dissemination of new bodies of knowledge that can be applied both to products and high-quality individuals, people who can rely on themselves and assist in national development. Presently, there are 156 universities in Thailand, 27 of which are autonomous, 57 of which are governmental universities, and 72 of which are private institutions and universities [8]. The effects of technological changes have led to uncertainty about whether the former educational paradigm still meets learners' needs. Many Thai universities are thus forcing their organizations to become more digital, creating a trend towards transformation and the development of digital universities that will be able to thrive in the present situation. Policies and planning of digital technology by the Ministry of Higher Education, Science, Research, and Innovation (MHESRI) have attempted to urge universities to develop into digital organizations. This has increased the motivation of Thai universities to transform their organizations to the fullest extent [7]. In addition, a collaborative network of Thai universities has been established, the Chief Information Officer (CIO) Digital University Forum, the major objectives of which are to offer a venue for exchanging and proposing concepts, and learning and sharing information related to the universities' adoption of technologies and digital transformation. At present, there are 18 member organizations [9]. A review of related literature showed that only 6 Thai universities have clear policies and implementation plans for digital transformation, namely, 1) Thammasat University, 2) King Mongkut University of Technology North Bangkok, 3) Khon Kaen University, 4) Chiangmai University, 5) Prince of Songkhla University, and 6) Silpakorn University.

Digital transformation is a strategy of organizational change that incorporates digital technology into all areas of an organization, both within and without. A university requires knowledge and understanding of the following important factors to allow streamlined and convenient organizational transformation:

1) Organizational Culture – Significantly, cultural transformation in an organization begins with conceptual changes that enable new approaches to be implemented. This commences from the high-level executives who lead from top to bottom, or in some organizations along parallel lines, or from bottom to top [10, 11]. Digital transformation will be successful if an organization has a culture that accepts change, is open, and has a willingness to transform [12]. The organizational values related to competition must be based on a similar culture or values all across the organization. A culture that emphasizes creativity and ambition can lead to the success of the digital transformation. In addition, Haffke et al. [13] and Grab et al.

[14] held similar opinions that a successful digital transformation must be supported by the organizational culture [1]. Nevertheless, even though organizational culture is important to digital transformation and is a prerequisite of the process, there is as yet no empirical approach related to clear cultural enhancement [12].

2) Digital Strategies – Digital transformation is a matter of strategic development in which an organization is revamped so that it can sustainably exist in a digital world. Digital strategic policies must be connected to the organization's other strategies [4, 15]. If an organization can develop an efficient digital strategy, it can achieve the implementation of a digital format [16]. An organization must improve its policies and use digital strategies that relate to its vision and goals [11]. There must also be clear steps for the implementation of all activities. Digital strategies support and enable an organization to achieve its digital transformation goal. Such strategies go hand-in-hand with digitally-competent leaders. Digital adroitness means that operations are adjustable and flexible according to the situation Leischnig et al. [17]. Moreover, Dugstad et al. [18] and Schmidt et al. [19] pointed out that high-quality digital strategies and strategies that enable clear practices are important to the success of a digital transformation.

3) Digital Technologies – Digital technologies are another aspect that an organization requires to achieve its digital transformation [16], commencing with hardware installation and the development of platform structures to modify the organization's systems to support digital operations [20]. Having modern and high-quality technologies is a priority for organizations [21]. The ability to understand technological advances and introduce them in all parts of an organization will benefit the organization's digital transformation [14]. In this regard, Wolf et al. [22] confirmed that the factors driving the success of digital transformation include having modern technologies and space for personnel to jointly develop innovations. The development of human competency with information systems will help lead to the success of the organization's digital transformation [1]. However, aside from the provision of digital technologies in an organization, Dugstad et al. [18] explained that the efficiency and reliability of these technologies are important, as any uncertainty about information technology infrastructures and mobile phone networks could be a major obstacle to digital transformation.

4) Organization Leaders – When an organization attempts to transform its entire operation and processes into a digital organization, the administrators' leadership and digital vision are vital. The two elements will impact the long-term transformation process [23]. The transformation process must start with the high-level administrators who are involved in designing the organization's policies and plans. Administrators must possess a good understanding of the trends in customers' demands and considerable experience in the organization of operations [15]. They must be willing to drive digital transformation in order to remain competitive in the market [24]. Horlacher, Klarner, and Hess explained that organizational administrators play an important role in the operations of digital transformation, from the first stage until the outcomes are achieved [25]. They must build motivation, confidence, and awareness in their personnel about the importance of the digital, and they must act as the key driver of digital culture, promoting utilization of the digital multiplicity, encouraging teamwork, and introducing innovations, as well as regularly increasing their own digital competency [26].

5) Staff – An organization undergoing a digital transformation must have knowledgeable, skillful, and understanding staff members who can operate and apply various digital technologies with appropriateness and efficiency in different venues and situations. Digital competency helps staff participate in activities and enables them to communicate and work as a team towards a digital organization [27]. Since staff knowledge and competency are important to developing a digital organization [14], organization leaders must enhance and develop staff competency by building a common working space [28]. Osmundsen et al. [1] stated that staff is an important factor in an organization's digital transformation process [1]. Others have added that since the digital transformation will impact organization personnel, it requires their participation to be achieved to the fullest capacity [29, 30].

6) Management Process – Rapidity and adroitness are necessary for an organization to achieve digital transformation [1]. However, aside from rapid, the digital transformation process must also be of high quality. A good management process does not have any fixed form, but the approaches should suit the organization's context and environment. Digital transformation activities should be planned by setting goals, designing operational processes, and evaluating efficiency improvements [31]. Systematic management during the early stages of the transformation will lead to simpler operations down the line. Wolf et al. also mentioned that since transformation must be carried out with technological support, in order to keep pace with the transformation, the organization must emphasize proactive and efficient management [22].

Based on the review of related literature, the researchers proposed a component structure of the factors that influence organizations' digital transformation and used this structure to test the model congruence based on confirmatory factor analysis. The six factors listed above were analyzed in the form of 49 variables. These included 8 organizational culture variables, 10 digital strategies variables, 7 digital technologies variables, 8 organization leaders variables, 8 staff variables, and 8 management process variables.

3. Methodology

A quantitative research method was applied to study the factors that influence the digital transformation of universities in Thailand. The research unit was the Thai university, under the remit of the Office of Higher Education Commission, Ministry of Higher Education, Science, Research and Innovation. The researcher selected six autonomous universities to study that were members of the CIO Digital University Forum and therefore had well-clarified policies for digital transformation [9, 32]. The research process involved the following steps:

Step 1 – Analysis of the prior literature and research related to the factors leading to digital transformation success to obtain clear insights on which to base the questionnaire, which was the research tool. Data collection was divided into 2 parts: Part 1, the informants' baseline data, and Part 2, data on the factors influencing the success of digital transformation, i.e., 1)

organizational culture, 2) digital strategies, 3) digital technologies, 4) organization leaders, 5) staff, and 6) management process.

Step 2 – Three experts verified the quality and validity of the tool prior to its trial with 30 people not belonging to the sample group. Next, the reliability of the questionnaire was calculated based on the alpha coefficient formula designed by Cronbach [33]. The reliability of the tool was found to be 0.92.

Step 3 – The data were collected from the administrators of the 6 selected universities, comprising 303 high-level administrators (164 of whom returned the completed questionnaire, or 44.13%), 174 middle-level administrators (91 of whom returned the questionnaire, or 52.30%), and 18 low-level administrators (16 of whom returned the questionnaire, or 88.88%). In short, 495 questionnaire forms were sent out, and 271 were returned (54.74%).

Step 4 – The statistical analysis was performed using the Confirmatory Factor Analysis (CFA) Method and the AMOS Program to test the congruence of the simulated model that led to the success of digital transformation in Thai universities. The indicators used to check the congruence of the model with the empirical data included: the Chi-square goodness of fit statistics, the Comparative Fit Index (CFI), the Goodness of Fit Index (GFI), the Adjusted Goodness of Fit Index (AGFI), the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Square Residual (SRMSR), the Normed Fit Index (NFI), and the Incremental Fit Index (IFI).

4. Findings and Discussion

The confirmatory factor analysis of the simulated model of factors influencing the success of the digital transformation of Thai universities was performed by verifying the appropriateness and correctness of the confirmatory factor model and improving the model until the statistical parameters were acceptable. This was achieved by linking the Modification Indices by considering the factor loadings of the variables and R2 that enabled co-variance of the indicators. In the course of the confirmatory factor analysis, after adjusting for discrepancies, the congruence with empirical data was found to be within an acceptable range. The model showed significant congruence with the empirical data at 0.05, with a Chi-Square value of 756.091, df of 808.0, Sig. of 0.904 > 0.05, and CMIN/df. of 0.936 < 2.1 (see Figure 1). The findings agreed with those of Hair [34], Bollen [35], and Joreskog and Sorbon [36]. All 6 indicators had the anticipated congruence, and the statistical parameters met the set criteria (Table 1).

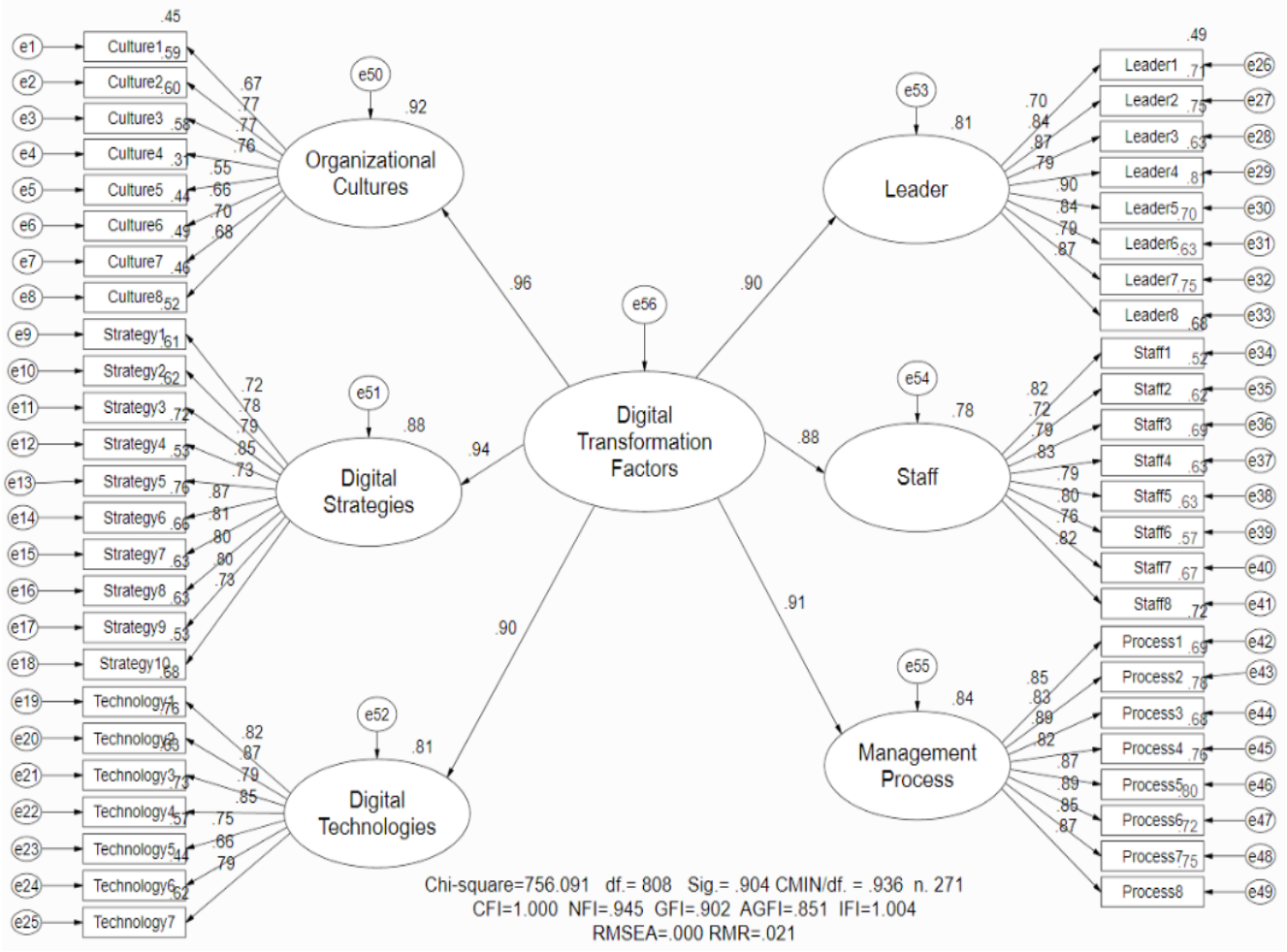

Figure 1.
Confirmatory factors of the model that affected the success of digital transformation in Thai universities.

Table 1.
The statistics of the congruence of the model's confirmatory factors.

Indicators	Criteria	Outcomes	Conclusion	Criteria references
Chi-Square = 756.091 df. = 808.0				
Sig.	> 0.05	0.904	Met the criterion	[34-36]
CMIN/df.	< 2.0	0.936	Met the criterion	[35, 37]
GFI	> 0.80	0.902	Met the criterion	[34, 38]
AGFI	> 0.80	0.851	Met the criterion	[39, 40]
NFI	> 0.90	0.945	Met the criterion	[34, 37]
IFI	> 0.90	1.004	Met the criterion	[34, 41]
CFI	> 0.90	1.000	Met the criterion	[34, 37]
RMR	< 0.05	0.021	Met the criterion	[37]
RMSEA	< 0.05	0.000	Met the criterion	[34, 42]

The confirmatory analysis performed on the simulated model of the factors influencing the digital transformation of Thai universities included 6 latent variables and 49 observable variables as follows: 1) eight variables under organizational culture, 2) ten variables under digital strategies, 3) seven variables under digital technologies, 4) eight variables under organization leaders, 5) eight variables under staff, and 6) eight variables under management process. The results led to conclusions regarding the factors that influence the success of Thai universities' digital transformations, which are presented in the form of descriptive statistics set out in Table 2.

Table 2.
Factors influencing the digital transformation of Thai universities (N = 271).

Variables (Factor)	Mean	S.D.	Factor Loading
1. Organizational culture			0.96
A clear policy has been set and communicated to all personnel to prepare for the enhancement of organizational culture.	4.36	0.71	0.67
Good digital attitudes are regularly promoted to build cooperation with the organization's transformation.	4.27	0.77	0.77
Activities are organized to educate and develop staff's digital skills, which leads to a cultural transformation in the organization.	4.28	0.79	0.77
Activities are held to build digital cooperation among staff in all sections.	4.21	0.84	0.76
Digital implementation plans are rolled out gradually to lessen pressure on the staff.	4.10	0.90	0.55
Digital projects are applied to all steps, allowing operations to be carried out through systems and platforms.	4.26	0.74	0.66
The same standards of fundamental digital efficiency are used across the organization.	3.88	0.92	0.70
The legal section is coordinated in transforming and revoking regulations that obstruct digital applications.	4.09	0.98	0.68
2. **Digital strategies**			0.94
Digital plans are set as clear guidelines to drive the organization forward.	4.32	0.73	0.72
Digital strategies can be adjusted according to the situation.	4.19	0.77	0.78
Digital strategies are integrated with the organization's other strategies.	4.18	0.77	0.79
There is a digital strategy (digital signature) to support digital workflow.	4.14	0.89	0.85
There is a digital strategy to support instruction based on modern platforms and technologies.	4.39	0.74	0.73
There is a digital strategy that emphasizes organizational ecology management and appropriate infrastructure.	4.08	0.81	0.87
There is a digital strategy that encourages all sections to cooperate in driving the organization forward.	4.07	0.84	0.81
There is a digital strategy that emphasizes digital security in common access to information.	4.10	0.81	0.80
There is a digital strategy that sets out the needs of stakeholders as implementation guidelines.	3.94	0.83	0.80
A budget is clearly allocated to support the work of digital transformation.	4.06	0.98	0.73
3. Digital technologies			0.90
Internal technological transformation is planned and continually carried out.	4.23	0.79	0.82
There is leadership regarding modern technologies and the ability for quick reaction and initiation.	4.10	0.87	0.87
Digital technology structures, systems, and platforms have been developed (IoTs, Cloud, RPA, Cyber Security).	4.10	0.87	0.79

Variables (Factor)	Mean	S.D.	Factor Loading
Digital technologies, systems, and platforms are used to administer and manage the work (Digital Signature, Data Analytics, Business Intelligence, Social Listening Tools).	4.13	0.88	0.85
Cloud technology is used for daily operations to enable online work (registration system, accountancy financing, online requests, leave-taking, welfare reimbursement, and personnel work evaluation system).	4.16	0.90	0.75
Digital technologies, systems, and platforms are used for instruction and research (Online Meetings, Virtual Classrooms, Developer Tools, Research Systems).	4.56	0.67	0.66
Big data solutions are used for analysis and to create policies for common usage.	3.95	0.90	0.79
4. Organization leaders			0.90
Key responsible people are appointed as digital transformation leaders.	4.54	0.70	0.70
University administrators have a good vision of digital transformation.	4.44	0.74	0.84
University administrators have an interest in digital technologies and attempt to apply these in their work process.	4.37	0.75	0.87
University administrators are willing to accept the digital transformation.	4.50	0.68	0.79
University administrators have the leadership and abilities to build motivation and confidence in the digital transformation among personnel.	4.32	0.72	0.90
University administrators encourage staff to utilize digital multiplicity.	4.27	0.75	0.84
University administrators encourage staff to join teams and create innovations.	4.20	0.81	0.79
University administrators encourage staff to learn and increase their digital competency regularly.	4.24	0.81	0.87
5. Staff			0.88
Plans and policies are clearly in place to develop the digital competency of staff at all levels.	4.06	0.86	0.82
Staff members have good attitudes, willingness, and acceptance of the organization's digital transformation.	3.99	0.83	0.72
Staff members have the knowledge and ability to apply various appropriate digital technologies.	3.87	0.85	0.79
Staff members participate in operations and can work in teams to achieve organizational progress.	3.94	0.85	0.83
Staff members are regularly trained in the basic use of technologies.	4.13	0.88	0.79
Staff members are regularly trained in the advanced use of technologies.	3.54	1.01	0.80
Staff members are regularly tested in digital competency.	3.40	1.06	0.76
Staff members regularly develop their digital skills.	3.77	0.97	0.82
6. Management process			0.91
There is a systematic and flexible digital transformation process that is readily changeable according to the situation.	4.08	0.79	0.85
There are proactive digital transformation processes in place, based on the needs of stakeholders.	4.00	0.83	0.83
There is a process to raise awareness of the importance of digital transformation among all levels of staff.	4.09	0.79	0.89
There is a process for planning a clear digital drive, with key objectives that emphasize an increase in efficiency.	4.18	0.79	0.82
There is a clear process to promote digital organizational culture.	4.09	0.84	0.87
There is a process to prepare staff with skills and competencies suitable for digital operations.	4.10	0.88	0.89
There are continuing processes for the digital transformation of the organization.	4.10	0.87	0.85
There is a process for regularly evaluating the digital transformation work.	3.99	0.89	0.87

Table 2 sets out the 6 factors influencing the digital transformation of Thai universities. It was found that organizational culture had the greatest effect on digital transformation, with the highest factor loading ($\beta = 0.96$), followed by digital strategies ($\beta = 0.94$), and the management process ($\beta = 0.91$). Considering the results item by item, the findings are as follows:

1) Organizational culture, 8 variables – It was found that if a university set clear policies to prepare for digital culture enhancement and communicated the policies to ensure the common understanding of the personnel, the cultural transformation would be successful ($\bar{x} = 4.36$). However, the universities were also found to hold to the concept of regularly improving digital attitudes and building cooperation with the organizational transformation, and the universities organize activities that build knowledge and develop the staff's digital skills, which help achieve cultural transformation. The factor loading in this category was the highest ($\beta = 0.77$), followed by organizing activities to increase the digital participation of staff in all sections ($\beta = 0.76$). On the other hand, the variable of gradual implementation of digital plans to lessen the pressure on staff was not as important as expected, with the lowest factor loading ($\beta = 0.55$).

These results correlated with those of Osmundsen et al. [1] and Grab et al. [14], who found that the success of digital transformation depends on support from the organization's digital culture. Perfect digital cultures are those that have undergone profound digital intervention in the organization (Digital DNA at the Core), strategic development, and cross-organizational and cross-functional planning to provide various resources for the growth of the organization in all respects. Digital DNA leads to adroitness and better adjustment [43]. Additionally, regular good attitudinal adjustment of the staff will make cultural changes simpler. However, the greatest obstacle to digital transformation turned out to be the working culture of the staff, since they were familiar with the traditional working style and could thus represent an opposing force [15].

2) Digital strategies, 10 variables – The majority of informants believed that the most important variable was that the university had a digital strategy to support instruction via platforms and modern technologies ($\bar{x} = 4.39$). However, the highest factor loading was given to the university having a digital strategy that emphasizes appropriate organizational ecology and infrastructure ($\beta = 0.87$), followed by a digital strategy that supports workflow with digital signatures ($\beta = 0.85$), and the university having a digital strategy that encourages all sections to cooperate in driving the organization forward ($\beta = 0.81$).

It can be seen that digital strategies are important and necessary for an organization to achieve its objectives [44]. Digital transformation requires strategic development for transformation and the introduction of modern technologies to support this drive. Universities must have a clear understanding in this respect [15]. Yeow, Soh, and Hansen stated that when an organization creates digital strategies and carries them out according to their design, the next important step is to manage the ecological system and develop resources that are necessary and appropriate to achieve the goal [45]. Digital strategies are also associated with a digitally competent leader, as such a leader will be able to promote and support streamlined operations that are flexible in accordance with consumers' experiences [17]. Studies by Dugstad et al. [18] and Schmidt et al. [19] have also shown that digital strategies that promote staff participation and lead to digitally streamlined operations will lead to success in digital transformation.

3) Management process, 8 variables – Most of the informants regarded as most important the fact that universities have a clear process for planning the digital transformation and have principle objectives that emphasize an increase in organizational efficiency ($\bar{x} = 4.18$). Nevertheless, the university having a process for training staff with the appropriate skills and competencies for digital work and the university having a process to create awareness of the importance of digital transformation among all levels of staff showed the greatest factor loading ($\beta = 0.89$), followed by the university having a clear process to promote digital culture and the university having a clear and regular process for evaluating its operations ($\beta = 0.87$).

The results of the study showed that university administrators see the importance of clear and high-quality management processes. Management processes must be of good quality. Guidelines should be provided that match the goals, context, and environment of the organization [1]. The digital transformation process must comprise the following key activities for goal setting: the implementation method and the evaluation of efficiency improvements [31]. A university that sees the importance of systematic digital transformation management early in the process will find that operations run more smoothly. In addition, a study on the factors behind organizations' successful digital transformation showed that proactive management of digital transformation and rapid implementation are key factors that will help the organization achieve its goal [22].

4) Organization leaders, 8 variables – The university appointing a key responsible person as a leader of the digital transformation is the most important variable ($\bar{x} = 4.54$). However, most informants reported that the leadership of university administrators can create motivation and confidence regarding the digital transformation among staff. This variable showed the highest factor loading ($\beta = 0.90$), followed by the administrators' interest in digital technology and attempting to apply it to the working process, and the university administrators' encouraging staff to learn and increase their digital competency, with an equal factor loading ($\beta = 0.87$).

The study demonstrated that digital transformation in the university context requires high-level administrators who are knowledgeable and experienced in the transformation. The administrators should be the ones who drive the organization forward and carry out the process from beginning to end. They should be supported and assisted by information technology personnel [15, 25]. The administrators must be willing to accept the digital transformation [24]. A study by Hulme showed that digital leadership is an important matter, as it assists administrators in encouraging staff to utilize the digital multiplicity, promoting teamwork to create innovations and inventions, and encouraging staff to learn and increase their digital competency [26]. All these factors lead to success in digital transformation.

5) Digital technologies, 8 variables – It was found that most informants regard as most important the university's use of digital technologies, platforms, and systems for instruction and research (Online Meetings, Virtual Classrooms, Developer Tools, Research Systems) ($\bar{x} = 4.56$). Meanwhile, the university's leadership in modern technologies, ability to respond promptly, and initiative had the highest factor loading ($\beta = 0.87$), followed by the university's use of digital technologies, systems, and platforms for administration (Digital Signature, Data Analytics, Business Intelligence, Social Listening Tools) ($\beta = 0.85$) and the university's plans for internal technological transformation and continuous implementation ($\beta = 0.82$).

The results were consistent with the work of Grab et al. [14], who explained that the fact that an organization understands the progress of technology in the digital era and applies it in all sections of the organization will benefit its digital transformation. The development of an organization's information system will also help it achieve its digital transformation goal [1]. However, a study by Dugstad et al. [18] explained that the reliability of technology is an important element that leaders of organizations should emphasize. Unreliability of the information technology infrastructure or mobile phone networks can be a major obstacle to digital transformation. In addition, Futurum Research [21] and Wolf et al. [22] studied organizations' digital transformation success factors and found that high-quality and modern digital technologies and a common zone for innovation development will lead to successful digital transformation.

6) Staff, 8 variables – The regular training of staff in basic technology was the most important variable ($\bar{x}$ = 4.13). When factor loading was considered, the variable of staff participation in implementation and team activities towards digital transformation received the highest factor loading (β = 0.83). The next highest factor loadings (β = 0.82, equally) were for the university planning and creating policies for the digital competency development of staff at all levels, and that the staff members regularly develop themselves concerning digital technology.

It can be seen that most informants regard the staff as the least important factor. Nevertheless, the study indicated that staff is important, especially their digital competency development, which enables them to work together in the digital environment. A study by Grab, et al. [14] showed that the knowledge and competency of staff are important for the development of a digital organization. The skill of staff is the 4th most important factor. Baum stated that an organization must create a flexible and interesting working environment, promote basic digital skills, and create a center for advanced digital training within the organization to enable the staff to use the venue to work together [28]. This aligns with Mihailescu and Mihailescu [29], who stated that staff members are unavoidably impacted by digital transformation. Therefore, it is necessary for them to contribute to the digital transformation for the organization to progress at its full capacity.

5. Conclusion

The digital transformation of organizations all over the world entails significant organizational reform to enable the organization to continue to operate in this age of ever-changing technology. An organization may fail to become digital if the development of products and services is missing or the implementation approaches have not been modified to meet the demands of stakeholders, who, in their turn, have inevitably been encouraged to use technology in their daily lives. The study of the factors that influence the digital transformation of organizations has provided the necessary knowledge to guide Thai university's operations in the changing environment, in the categories of organizational culture, digital strategies, digital technologies, organization leaders, staff, and management processes. These are the important factors required to prepare organizations for the big shift to digital. They offer crucial guidelines to make the digital transformation successful. Nevertheless, the scope of this research has been limited to data collected from a selection of big universities in Thailand. It may not be applicable to other types of universities with different contexts, levels of readiness, and limitations. Administrators or executives in charge of organizations' digital transformation are recommended to select and apply the results according to the context and environment of their own organization to achieve appropriate and efficient outcomes.

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