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Factors Influencing the Digital Transformation Toward High-Performance Education Organizations

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Abstract

This study investigates in-depth information about the factors influencing the digital transformation of an educational establishment to becoming a high-performance education organization through the dimensions of digital enterprise architecture, digital transformation, and high-performance education organization using structural equation modeling (SEM) as a tool to verify the model. A sample of 520 staff members, selected using a multi-stage random sampling method from 22 departments under the Office of the Basic Education Commission (Head Office), Ministry of Education, Thailand, answered an online questionnaire. The results revealed that the model was valid and fit with the empirical data. The results also showed that business architecture, data architecture, application architecture, technology architecture, security architecture, human capital architecture, and infrastructure architecture had a direct and indirect influence on the context of digital transformation and high-performance education organizations. There was technology architecture and human capital architecture that had an indirect influence on high-performance education organization; other than that, there was none. All hypotheses (H1–H10) were supported by statistical criteria. These results indicate that digital enterprise architectures are essential development tools influencing an organization toward becoming a high-performance education organization.

Keywords: digital transformation, enterprise architecture, high-performance education organization, structural equation modeling

1. Introduction

Digital technology has a broad impact on all sectors, including educational organizations, whether public or private. It affects the both internal and external environment of an organization, causing it to adapt by way of digital transformation, which integrates digital technology to facilitate and empower all areas of the organization (Antonopoulou et al., 2023). Digital technology affects various internal and external dimensions, such as business operations, decision-making, and organizational structure, which is a challenge for every organization today. Organizations that successfully develop management skills and appropriate technologies will benefit from new digital technologies (Tungpantong et al., 2022). Digital transformation changes an organization's operations through emerging technologies and innovative business models. Beyond that, it creates new skills and models within organizations that are in-depth and strategic (Katyeudo & de Souza, 2022). Moreover, it is also a conceptual change. The application of technology in the digital age ranges from laying the foundation goals of business operations to delivering value to customers. Digital transformation includes cultural changes within organizations in which personnel in all sectors must participate in order to increase effectiveness and competitiveness (Digital Government Development Agency (Public Organization) (DGA), 2022). It improves organizations by integrating information technology, processing, communication, and connecting digital technologies, thus leading to significant organizational changes (Vial, 2019). It is not only a change to the mechanical organizational structure, but also has an impact on the society within the organization through information sharing and collaborative working to achieve successful adaptation and acceptance of digital transformation processes (Ebert & Duarte, 2018). The implementation of digital technology will increase growth opportunities, giving organizations agility and creating strategic advantages that positively impact operating results (Songkajorn et al., 2022). Digital technology improves various aspects of an organization's operations, including creating new visions, processes, capabilities, organizational structure, and culture (Guo & Xu, 2021).

Digital transformation is an essential tool that can enable education bodies to become high-performance organizations by creating competitive advantages in the digital era. It improves operational efficiency, business processes, innovation, and services (Björkdahl, 2020). It is a significant change that requires improvement of organizational efficiency and creates long-term competitive advantage. A high-performance organization is one that maintains a strong culture and alignment between leadership, strategy, structure, adaptability, long-term management, management integration, and continuous improvement of core processes (Amah & Oyetunde, 2019). Driving educational organizations to become high-performance organizations using the integration of digital technology in a digital transformation process improves the efficiency of every dimension of their operations. The process supports flexible and seamless working and creates innovations such as distributed models, at any time and in any place. As a result, such organizations have both opportunities and challenges in respect of their adaptability and the dynamism of their leadership (D'Ambra et al., 2022). Public education organizations that aim to develop high levels of performance and modernization require strategic planning, operating perspective, and the ability to use technology to create innovation, infrastructure, and an agile organization. These are the key elements in setting strategic goals, creating a cooperation network through policy-driven organization, risk analysis, creating innovations, and applying multi-disciplinary knowledge to respond to a changing world (Gong et al., 2020). As a result, these organizations will become a modern digital workplace, creating value and increasing engagement.

Researchers recognize the importance of digital transformation for high-performance educational organizations. Therefore, this research focused on finding in-depth information about the factors affecting the digital transformation of an educational institution toward becoming a high-performance organization by considering the relationship between variables in each relevant dimension. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were used to verify the consistency of the model with empirical data (assessment of model fit). The paper is set out as follows. Section 2 describes the literature review. Section 3 presents the theoretical framework and hypotheses of factors influencing digital transformation to a high-performance organization model. Section 4 details the research methodology, including the participants, data collection instrument, and data analysis procedure. Sections 5 and 6 present the results obtained and the discussion. The conclusions of the research are set out in section 7.

2. Literature Review

2.1 Structural Equation Modeling

Structural equation modeling is a statistical data analysis technique used to confirm research hypotheses derived from related theories consisting of direct effect (DE) and indirect effect (IE). It can transform research hypotheses into mathematical models, which are techniques that show the expected relationships of variables. This relationship can be represented as a path diagram (Drigo et al., 2020). In addition, SEM is a popular statistical technique because it can be applied to find the research answers of factual or organismic and latent variables. It is also used to analyze research data with a research framework or conceptual framework with theoretical support concepts. SEM can also potentially analyze a multi-level casual model, a longitudinal factor analysis model, and other models (Tarka, 2018). Therefore, SEM is a confirmatory rather than exploratory technique because it uses data analysis to determine how accurately a model is generated from a conceptual theory review, concepts, and related research compared with empirical data (Money et al., 2023). In conclusion, SEM is a statistical method that can be used to confirm theories and can be applied to actual empirical data. It is a method that allows data errors obtained from the measurement of each observed variable to be related to each other so that the data analysis resulting from the model is more accurate. There are five important analysis steps of SEM: 1) model specification, 2) model identification, 3) model parameter estimation, 4) model evaluation, and 5) model modification (Cheung et al., 2023).

2.2 Enterprise Architecture

Enterprise architecture refers to the overall picture of a modern organization. It shows the relationship between objectives, vision, strategy, and governance principles. It also connects various aspects of business operations, such as business terms, organizational structure, processes and data, information systems and databases, and technological infrastructure, such as computers, operating systems, and networks (Dumitriu & Popescu, 2020). Enterprise architecture is the system components consisting of structure, network, hardware, and software. It also covers basic concepts or characteristics of systems in various environments. It is often used as a tool for managing operations, such as the future development of enterprises, and in rapidly changing environments, such as technological innovation, business models, or the enforcement of regulations causing continuous change. The development of new information systems is necessary for modern enterprises. The management of an enterprise's operation will become complicated if there is no framework or enterprise architecture to guide organizational

development. Enterprise architecture manages this complexity and establishes a connection between business processes, applications, data, and technology. It is a method for transforming organizations, supporting appropriate strategies for executives, and designing directions to achieve organizational goals (Costa & Brito, 2022). Enterprise architecture is an essential requirement for successful digital transformation in government agencies. It systematically develops and improves business processes and information and communication technologies according to the organization's vision and strategy. Enterprise architecture connects all the dimensions of an organization. It is not just a blueprint or document that details a current organization (Sararuch et al., 2022).

2.3 Digital Transformation

Digital transformation is the process of changing an organization or business using digital technology. Its scope ranges from strategic planning, setting business goals, operations, and production processes, to marketing and organizational culture change. In addition, it encompasses the leader's vision, the use of innovation for benefit, and the collection of data to analyze the organization's operational decisions that will enable it to adapt to the potential changes of the digital era quickly. Digital transformation is, therefore, significant for organizations. Leaders or executives must understand this and set clear goals to promote their organization's short-term and long-term operating strategies in the future (Rujira et al., 2020). The transformation of an organization to become digital involves many complex technologies. Organizations must embrace the strategic role of new digital technologies and their ability to create successful digital innovations. Modern technology with ubiquitous connectivity must be integrated with existing structures for more efficient operations, competitive advantage, and dimensional changes (Malisuwan & Kaewpanukrangsi, 2018). The advantages of digital transformation are: 1) it provides a new method of strategic thinking for organizations. 2) It increases efficiency and effectiveness. 3) Digital transformation in educational organizations brings many benefits, such as cost savings from reduced administrative time, ease of updating data, and the ability to take advantage of emerging technologies (Jummai, 2021). In addition, digital technology can be applied in various ways in educational contexts. It can enable the institution to become a digital education agency, or it can be used as an essential tool to help the educational institution deal with technological change. Many educational organizations combine the concept of digital transformation with their management and development strategies (Butrsaenlee, 2022).

2.4 High-Performance Organizations

A strong culture and alignment between strategy, structure, leadership, and employee skills characterize high-performance organizations. An organization's competitive performance usually manifests as adaptability to environmental changes and learning ability. Many organizations have increasingly focused on how to become high-performance organizations and have gained widespread attention. With the increasingly intense and fluctuating competition among various organizations in the global economy, they must readjust and surpass their competitors in terms of quality, innovation, and consumer expectation (Do & Mai, 2020). A high-performance organization has a system that constantly adapts its strategies, goals, objectives, and internal operations to the needs of the external environment to increase organizational performance. It also adapts and responds to change well and quickly, manages over the long term using an integrated and consistent management structure, continuously improves its core competencies, and treats employees as the main assets of the organization (Geleta, 2019). High-performance organizations can cope with changing circumstances well because they can quickly adapt to environments both inside and outside the organization and are flexible. According to de Waal's concept (de Waal & Linthorst, 2020), a high-performance organization consists of five factors: 1) management quality, 2) openness and action orientation, 3) long-term orientation, 4) continuous improvement and renewal, and 5) employee quality. Furthermore, High-performance organizations must be agile and adapt to rapidly changing environments.

3. Theoretical Framework and Hypotheses

Structural equation modeling examines the relationship between observed and latent variables to determine the influence of latent variables and the validity of the theoretical or hypothetical model. The proposed model is formed of nine latent variables representing business architecture, data architecture, application architecture, technology architecture, security architecture, human capital architecture, infrastructure architecture, digital transformation, and high-performance education organization. The hypotheses assume that business architecture, data architecture, application architecture, technology architecture, human capital architecture, and infrastructure architecture directly influence digital transformation, whereas technology architecture, human capital architecture, and digital transformation directly influence high-performance education organization. This is presented in Table 1 and Fig. 1. The structural model includes 40 observed variables, nine latent variables, and ten dependency relationships between latent variables. The latent and observed variables were identified by synthesizing relevant

documents and research in international journals using content analysis techniques and in-depth interviews with experts, as shown in Table 2.

Table 1. Hypotheses

	Hypotheses	References
H1	Business architecture has a direct influence on digital transformation	(Azarov et al., 2021; Rujira et al., 2021)
H2	Data architecture has a direct influence on digital transformation	(Anthony Jnr, 2021; Tungpantong et al., 2022)
H3	Application architecture has a direct influence on digital transformation	(Azarov et al., 2021; Rujira et al., 2021),
H4	Technology architecture has a direct influence on digital transformation	(Costa & Brito, 2022; Rujira et al., 2021)
H5	Technology architecture has a direct influence on high- performance education organization	(Costa & Brito, 2022; Rujira et al., 2021)
H6	Security architecture has a direct influence on digital transformation	(Rujira et al., 2021; Zimmermann et al., 2018)
H7	Human capital architecture has a direct influence on digital transformation	(Anthony Jnr, 2021; Leipzig et al., 2017)
H8	Human capital architecture has a direct influence on high- performance education organization	(Leipzig et al., 2017; Rujira et al., 2021)
H9	Infrastructure architecture has a direct influence on digital transformation	(Rujira et al., 2021; Tungpantong et al., 2022)
H10	Digital transformation has a direct influence on high-performance education organization	(Leipzig et al., 2017; Rujira et al., 2021; Zimmermann et al., 2018)

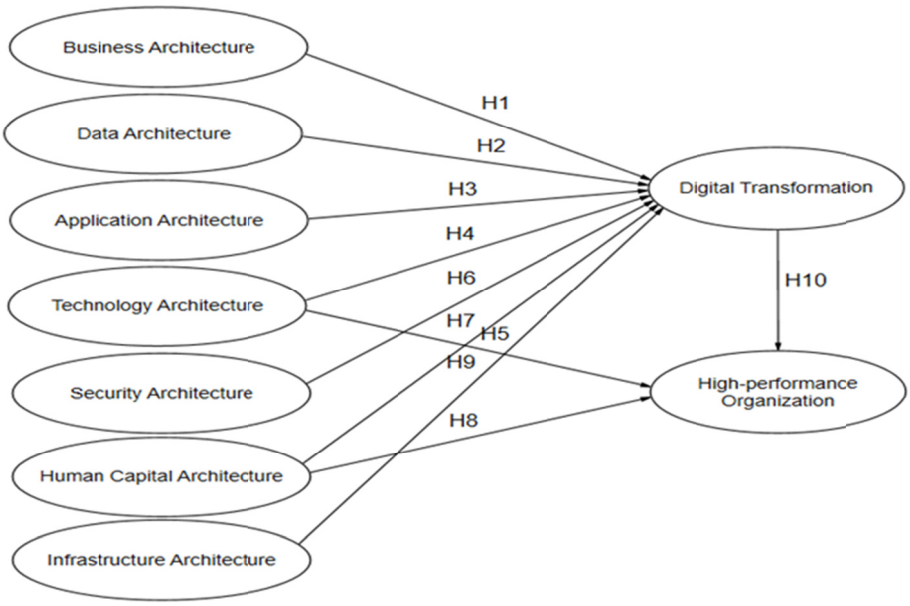

Figure 1. Research framework

Table 2. Latent and observed variables

Latent Variables	Observed Variables	Description
Business Architecture (BA)	BA1	Educational management and promoting
	BA2	School and administration management system
	BA3	Innovation and educational technology development
	BA4	Human resources development and management
Data Architecture (DA)	DA1	Data collected in the central database
	DA2	Data collected by the internal database of each department
	DA3	Data stored in the form of electronic files
	DA4	Data stored as a document file.
Application Architecture (AP)	AP1	Administrative management application
	AP2	Smart office management application
	AP3	School and academic services management application
	AP4	Digital learning and knowledge management application
Technology Architecture (TA)	TA1	Educational management technology
	TA2	Operation and services technology
	TA3	Data processing technology
	TA4	Data storage and management technology
Security Architecture (SA)	SA1	Laws: data security, cyber security
	SA2	Policy: social media, data security
	SA3	Standard: Personal Data Protection Act
	SA4	Regulatory compliance: Risk management, data governance
Human Capital Architecture (HA)	HA1	Executive (C-Suite)
	HA2	Policy and academic specialist
	HA3	Technology specialist
	HA4	Others
Infrastructure Architecture (IA)	IA1	Hardware
	IA2	Software
	IA3	Network
	IA4	Seamless working ecosystem
Digital Transformation (DIT)	DIT1	Digital strategy: policy, strategy, action plan, monitoring
	DIT2	Digital workflow: digitization, digitalize process, digital platform, digital ecosystem
	DIT3	Digital manpower: digital competency, digital literacy, digital government skills set, PDPA
	DIT4	Digital organizational culture: team collaboration, digital first mindset, growth mindset
	DIT5	Digital infrastructure, analytics, open data platform, distributed network
High-performance Education Organization (HPO)	HPO1	Leadership: vision, mission, policy
	HPO2	Strategic planning: strategic and flexible plan, setting goals
	HPO3	People-centric services: innovation, communication system
	HPO4	Knowledge management: storage system, central database
	HPO5	Human resources development: digital workplace, career path
	HPO6	Process management: improving core and supporting process
	HPO7	Results: action plan, operation, service quality, development

4. Research Methodology

4.1 Population and Sample

The research population was personnel from the Office of the Basic Education Commission (Head Office) of the Ministry of Education, Thailand. The sample was taken from 22 departments and comprised 1,102 participants. Therefore, this study established an appropriate sample size using a multi-stage random sampling method, resulting in 520 samples to answer the online questionnaire (White, 2022).

4.2 Data Collection Instrument

The research instrument was a closed-ended questionnaire examining the factors influencing the digital transformation of an education establishment to become a high-performance education organization. The questionnaire was mainly divided into three parts. Part 1 covered general information about the respondents,

including gender, education, status, and internal department. Part 2 consisted of 76 evaluation items, which were divided into three dimensions that were rated on a five-point Likert scale: digital enterprise architecture (divided into seven sub-dimensions), digital transformation (divided into five sub-dimensions), and high-performance education organization (divided into seven sub-dimensions). Each sub-dimension was further divided into four items. All the questionnaire items were obtained from synthesizing relevant documents and research in international journals using content analysis techniques. The third part of the questionnaire was an open-ended question about the participants' opinions and asked for suggestions about factors influencing the digital transformation to a high-performance education organization. The quality and validity of this research tool were verified by nine experts using the Index of Item-Objective Congruence (IOC). The index score range was 0.78–1.00, which was greater than 0.5, indicating that the research tool was appropriate for collecting data. The researchers used the questionnaire to conduct a pilot study with 30 people and analyzed the reliability of the entire questionnaire using Cronbach's alpha coefficient. The results indicated that the reliability of the questionnaire was 0.991 (Cheung et al., 2023).

4.3 Data Analysis Procedure

Data obtained from an online questionnaire survey and general data about the respondents was analyzed. The mean and average standard deviation of the factors influencing a digital transformation to a high-performance education organization was analyzed from various dimensions: 1) digital enterprise architecture, 2) digital transformation, and 3) high-performance education organization. This was followed by a CFA analysis to verify the factor structure of the observed variables. The variables in each construct were analyzed using the technique of connecting arrows between the errors by considering the modification indices (MI), analyzing the correlation between the variables, and examining the distribution of descriptive statistics. All factors were input to an SEM model. There were nine main latent variables and 40 observable variables. Then, the MI was used to modify the discrepancies within the proposed model. The model was examined by considering the factor loadings and R2 values to examine the covariation and the evaluation of goodness-of-fit indices to certify how well the model fit the data. The indices consisted of Chi-square, relative chi-square, incremental fit index (IFI), adjusted goodness-of-fit (AGFI), normed fit index (NFI), goodness-of-fit index (GFI), root of mean square residual (RMR), comparative fit index (CFI), and root mean square error of approximation (RMSEA) (Hair et al., 2014; Hu & Bentler, 1999; Diamantopoulos & Siguaw, 2000).

5. Results

This section addresses the research results following the SEM data analysis. Section 5.1 summarizes the general information of respondents. Section 5.2 describes the SEM analysis of the factors influencing the transformation to a high-performance education organization. Section 5.3 discusses the path analysis of the model.

5.1 Summary of Respondent's General Information

Regarding gender distribution, the number of female respondents was higher than male (53.70%; n=279 and 46.30%; n=241, respectively). Most respondents had graduated with a bachelor's degree (82.70%; n=430), followed by a master's degree (14.60%; n=76), a doctoral degree (1.70%; n=9), and a lower bachelor's degree (1.00%, n=5). The status backgrounds were very diverse: 90.00% (n=468) was academic staff, 7.90% (n=41) general staff, and 2.10% (n=11) directors as shown in Table 3.

Table 3. Respondent's general information

Demographics	Group of Data	Amount	Percentage
Sex	Male	241	46.30
	Female	279	53.70
	Total	*520*	*100*
Education	Lower bachelor's degree	5	1.00
	Bachelor's degree	430	82.70
	Master's degree	76	14.60
	Doctoral degree	9	1.70
	Total	*520*	*100*
Status Background	General staff	11	2.10
	Academic staff	468	90.00
	Director	41	7.90
	Total	*520*	*100*

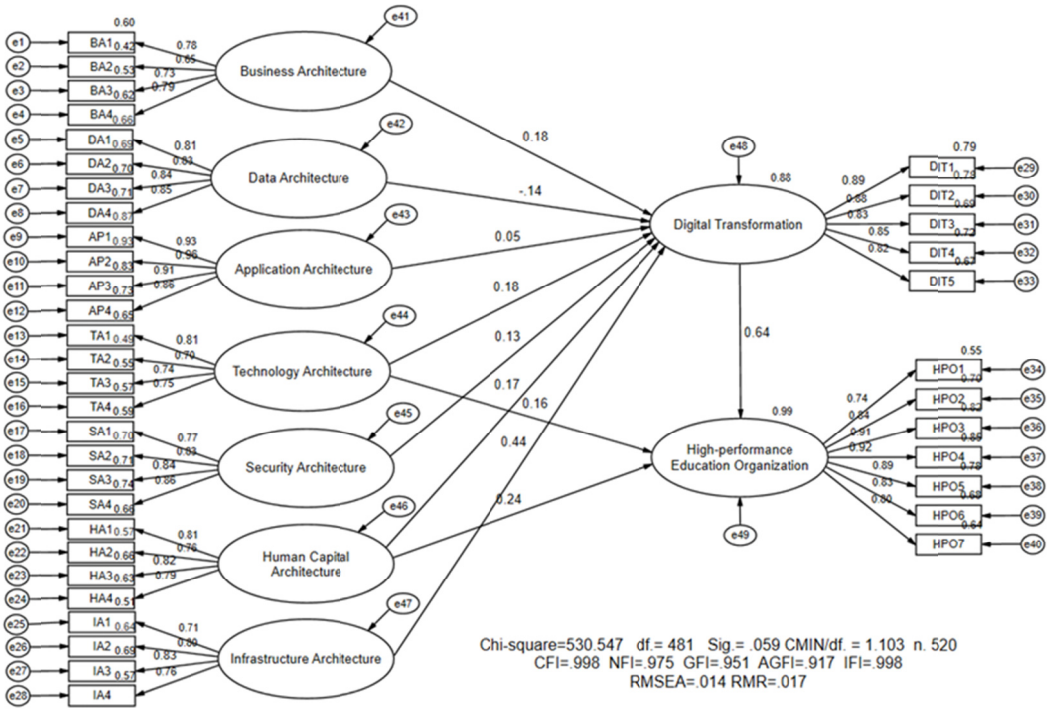

Figure 2. Structural model results

5.2 The Analysis of SEM of the Factors Influencing the Transformation to a High-Performance Education Organization

The SEM analysis results of factors affecting the transformation to a high-performance educational organization, as shown in Fig. 2, include nine latent variables: 1) the digital enterprise architecture dimension, consisting of business architecture, data architecture, application architecture, technology architecture, security architecture, human capital architecture and infrastructure architecture, 2) digital transformation, and 3) a high-performance education organization. A total of 40 observable variables were included. Using the MI to modify the discrepancy between variables, the results found that all index statistics passed the specified criteria, indicating that this model was valid and fit with the empirical data. The model's goodness-of-fit indices statistics' considered Chi-square = 530.547, df = 481.0, Sig. = 0.059 > 0.05, CMIN/df. = 1.103 < 2.0, CFI = 0.998 > 0.90, GFI = 0.951 > 0.90, AGFI = 0.917 > 0.80, RMSEA = 0.014 < 0.05, RMR = 0.017 < 0.05, NFI = 0.975 > 0.90, NFI = 0.975 > 0.90, and IFI = 0.998 > 0.90.

Table 4. Path analysis results

Relationship			Direct Influence	Indirect Influence	Total Influence
BA	-->	DIT	0.18		0.18
	-->	HPO		0.12	0.12
DA	-->	DIT	-0.14		-0.14
	-->	HPO		-0.09	-0.09
AP	-->	DIT	0.05		0.05
	-->	HPO	0.03	0.03	0.03
TA	-->	DIT	0.18		0.18
	-->	HPO	0.16	0.12	0.28
SA	-->	DIT	0.13		0.13
	-->	HPO		0.08	0.08
HA	-->	DIT	0.17		0.17
	-->	HPO	0.24	0.11	0.35
IA	-->	DIT	0.44		0.44
	-->	HPO		0.28	0.28
DIT	-->	HPO	0.64		0.64
	R2		88.0%	99.0%	

5.3 Path Analysis

The path analysis results of the model, presented in Table 4, revealed that human capital architecture has the most significant influence on high-performance education organization with a total path coefficient of 0.35, followed by technology architecture and infrastructure architecture with a coefficient of 0.28, and were able to explain 99.0%, respectively. On the other hand, infrastructure architecture has the most significant influence on digital transformation with a total path coefficient of 0.44, followed by technology architecture and business architecture at 0.18, and able to explain 88.0%, respectively. Digital transformation has a significant influence on high-performance education organization, with a total path coefficient of 0.64, and able to explain 99.0%, with significance at the 0.05 level.

Table 5. Results of hypotheses

	Hypotheses			Path Coefficient	Std. Error	t-value	P-value	R2	Influence	Results
H1	BA	-->	DIT	0.18	0.06	2.794	0.005*	0.88	Positive	Supported
H2	DA	-->	DIT	-0.14	0.05	-2.190	0.028*	0.88	Negative	Supported
H3	AP	-->	DIT	0.05	0.02	2.012	0.044*	0.88	Positive	Supported
H4	TA	-->	DIT	0.18	0.05	3.244	0.001*	0.88	Positive	Supported
H5	TA	-->	HPO	0.16	0.05	2.738	0.006*	0.99	Positive	Supported
H6	SA	-->	DIT	0.13	0.04	2.199	0.028*	0.88	Positive	Supported
H7	HA	-->	DIT	0.17	0.06	3.468	0.000*	0.88	Positive	Supported
H8	HA	-->	HPO	0.24	0.04	5.867	0.000*	0.99	Positive	Supported
H9	IA	-->	DIT	0.44	0.08	6.774	0.000*	0.88	Positive	Supported
H10	DIT	-->	HPO	0.64	0.06	11.699	0.000*	0.99	Positive	Supported

* Statistical significance ($p < 0.05$).

The results of each hypothesis, presented in Table 5 are as follows:

1) Hypothesis H1: Business architecture has a positive direct influence on digital transformation: standardized regression weights = 0.18, standard error (SE) = 0.6, t. - value = 2.794, and influence changing 88.0% with significance at the 0.05 level. As a result, H1 was supported due to the statistical criterion (P-value = 0.005 < 0.05).

2) Hypothesis H2: Data architecture has a negative direct influence on digital transformation: standardized regression weights = -0.14, SE = 0.5, t. - value = -2.190, and influence changing 88.0% with significance at the 0.05 level. As a result, H2 was supported due to the statistical criterion (P-value = 0.028 < 0.05).

3) Hypothesis H3: Application architecture has a positive direct influence on digital transformation: standardized regression weights = 0.05, SE = 0.02, t. - value = 2.012, and influence changing 88.0% with significance at the 0.05

level. As a result, H3 was supported due to the statistical criterion (P-value = 0.044 < 0.05).

4) Hypothesis H4: Technology architecture has a positive direct influence on digital transformation: standardized regression weights = 0.18, SE = 0.05, t. - value = 3.244, and influence changing 88.0% with significance at the 0.05 level. As a result, H4 was supported due to the statistical criterion (P-value = 0.001 < 0.05).

5) Hypothesis H5: Technology architecture has a positive direct influence on high-performance education organization: standardized regression weights = 0.16, SE = 0.05, t. - value = 2.738, influence changing 99.0% with significance at the 0.05 level. As a result, H5 was supported due to the statistical criterion (P-value = 0.006 < 0.05).

6) Hypothesis H6: Security architecture has a positive direct influence on digital transformation: standardized regression weights = 0.13, SE = 0.04, t. - value = 2.199, and influence changing 88.0% with significance at the 0.05 level. As a result, H6 was supported due to the statistical criterion (P-value = 0.028 < 0.05).

7) Hypothesis H7: Human capital architecture has a positive direct influence on digital transformation: standardized regression weights = 0.17, SE = 0.06, t. - value = 3.468, and influence changing 88.0% with significance at the 0.05 level. As a result, H7 was supported due to the statistical criterion (P-value = 0.000 < 0.05).

8) Hypothesis H8: Human capital architecture has a positive direct effect on high-performance education organization: standardized regression weights = 0.24, SE = 0.04, t. - value = 5.867, influence changing 99.0% with significance at the 0.05 level. As a result, H8 was supported due to the statistical criterion (P-value = 0.000 < 0.05).

9) Hypothesis H9: Infrastructure architecture has a positive direct influence on digital transformation: standardized regression weights = 0.44, SE = 0.08, t. - value = 6.774, and influence changing 88.0% with significance at the 0.05 level. As a result, H9 was supported due to the statistical criterion (P-value = 0.000 < 0.05).

10) Hypothesis H10: Digital transformation has a positive direct influence on high-performance education organization: standardized regression weights = 0.64, SE = 0.06, t. - value = 11.699, and influence changing 99.0% with significance at the 0.05 level. As a result, H10 was supported due to the statistical criterion (P-value = 0.000 < 0.05).

6. Discussion

An SEM study of factors influencing the transformation of an educational establishment to become a high-performance education organization shows that the model is consistent with empirical data. The research results found that the components of the digital enterprise architecture dimension, namely, business architecture, data architecture, application architecture, technology architecture, security architecture, human capital architecture, and infrastructure architecture influence the digital transformation and high-performance education organization dimensions. The results are consistent with currently popular enterprise architecture frameworks such as the Zachman Enterprise Framework (ZEF), the Open Group Architecture Framework (TOGAF), and the Federal Enterprise Architecture Framework (FEAF), whose components consist of business, data, application, security, technology, and infrastructure (Dumitriu & Popescu, 2020; Camatti et al., 2020). They are also related to the components of e-government enterprise architecture: technology, data, business, infrastructure, and human resources (Mayakul et al., 2019). This is consistent with the study of Costa and Brito (Costa & Brito, 2022), stated that successful use of enterprise architecture in digital transformation must include business architecture, which is an essential framework that emphasizes the organization's direction, clearly critical workflows, governance guidelines, organizational structure, business strategies, vision, mission, and achievement organizational goals according to strategy, and data architecture, which is a framework for data standards, database format, database access methods, data groups, data structures both logical and physical levels, data and technologies management tools. It will support data sharing in organizations, including developing new data modes and structuring existing data. Javanbakht and Chia (2023) reported that application architecture is a framework for working process systems, components, subsystems, and data sharing between each system within the organization. Technology architecture and infrastructure architecture are the frameworks that support applications, database systems, and information technology infrastructure, such as computer resources, networks, storage, and devices. Afriliana et al. (2022) indicated that security architecture contributes to design system control standardization, protection, risk management, security system, and business privacy. It plays an operational support role in different aspects. Risk management and organization information security are essential because the data and information generated from an organization's operations, departments, or tasks are numerous, hierarchically different, and have different access permissions. Nakakawa et al. (2021) showed that human capital architecture is essential to driving performance improvement toward a high-performance education organization. This is due to the development of human resources with appropriate digital skills, the ability to adapt to technological changes, and performance according to their responsibilities, which will play an essential role in the digital transformation.

The path analysis results of both direct and indirect influence found that infrastructure architecture had the most significant influence on digital transformation at 0.44, followed by technology architecture at 0.18. In terms of high-performance education organization, it was found that human capital architecture had the most significant influence at 0.35, followed by technology architecture and infrastructure architecture at 0.28. This indicates that digital information, technology infrastructure, digital technology, and high-performance digital human resources are essential sectors for developing a future digital enterprise architecture framework or blueprint for an organization, as well as designing a development tool for organizational structures, business processes, and digital infrastructure, and a development plan to drive vision, mission, and strategy by systematically integrating technology into an organization's mission or workflow. This would help organizations to obtain better strategic flexibility and agility in a changing environment (Tungpantong et al., 2022; Landolsi et al., 2022). It is also the key to driving an organization toward becoming a high-performance education organization.

7. Conclusion

This study investigated the relationship between factors influencing the transformation of an educational establishment to become a high-performance education organization, including the dimensions of digital enterprise architecture, digital transformation, and high-performance education organization using SEM. The results showed that business architecture, data architecture, application architecture, technology architecture, security architecture, human capital architecture, and infrastructure architecture directly influenced digital transformation. Meanwhile, technology architecture, human capital architecture, and digital transformation directly influenced high-performance education organizations. This indicates that enterprise architecture is essential for influential educational bodies toward becoming high-performance education organizations. Future studies can continue to develop an enterprise architecture framework for the digital transformation of high-performance education organizations.

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Authors contributions

Surasak Srisawat conducted the research, analyzed the data and wrote the paper, and Assoc. Prof. Panita Wannapiroon and Prof. Prachyanun Nilsook done the research consulting.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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