Increasing the Competitiveness of the Thai Electrical and Electronics Industry in the Digital Economy Era

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Abstract

The objectives of this research are as follows: 1) To study the structure and operational characteristics of the Thai electrical and electronics industry in the digital economy era. 2) To study the components of enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era. 3) To develop a structural equation model (SEM) for enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era. 4) To obtain guidelines for increasing the competitiveness of the Thai electrical and electronics industry in the digital economy era. The study employed a mixed-methodology approach. The qualitative research involved in-depth interviews with a sample of 9 experts from 3 different groups. For quantitative research, data was collected via surveys from 500 entrepreneurs or executives and analyzed using frequency, percentage, average, standard deviation, and structural equation modeling (SEM) with the advanced statistical analysis software AMOS.

The research of organizations found that they have been operating for 10-15 years, are Thai-owned, use financial institutions for funding, are established as limited companies, and mostly located in Thailand. There is a decentralized management. Additionally, which focus on training of employees. Leadership development at various levels is emphasized. Technology and innovation are used to enhance productivity. There is a clear and structured operational management system.

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A factor influencing competitiveness is the bargaining power of buyers. The research findings reveal that the level of importance of each element to increase competitiveness. When considering individual aspects, all aspects are highly significant. Human capital potential is the most important, followed by the Learning organization, Dynamic capabilities, and Competitiveness capability. Development of structural equation modeling (SEM) to increase competitiveness. All elements are related in a positive direction. This finding is statistically significant at the 0.001 level and is consistent with all the hypothesized assumptions. Furthermore, guidelines for increasing found that these four components are crucial for effectively improving the competitiveness. This finding aligns with empirical data in theoretical contexts.

Keywords: Human Capital Potential, Learning Organization, Competitiveness Capability, Dynamic Capabilities

Introduction

The electricity and electronics industry is essential to the Thai economy because electrical and electronic appliances are Thailand's top export products, accounting for up to 27% of the total export value of goods in 2022. Furthermore, it is a foundational industry for advancing towards the Smart Electronics industry, which is one of Thailand's target industries in the First S-Curve group, focusing on driving manufacturing to be able to grow in line with the market's demands in the digital era, which will require advanced technology and various smart devices. Leveraging Thailand's strengths in producing electronic products for international companies for a long time, coupled with a solid industrial supply chain, Thailand needs to establish a high-value supply chain, increase the value of exports, and invest in the electrical and electronics industry. Additionally, it must elevate the development of the electronics industry using advanced technology to enhance competitiveness in the modern world. According to the World Semiconductor Trade Statistic (WSTS), the industry's overall

global export value has been continuously decreasing. It is expected that in 2023, the decrease will continue due to the worldwide economy that has not fully recovered, as well as the reduced global market demand. Furthermore, a significant factor in the global market is the uncertain Tech War situation between the United States and China, causing concern for many countries, which leads to a delay in production and exports. Therefore, it is necessary to closely monitor the situation to deal with the impact on the country's industry. (Electrical and Electronics Institute, 2022).

For the situation of the electrical and electronics industry in Thailand in the first quarter of 2023, the market value was equivalent to $6,150.39 million, a decrease of 1.79%. Meanwhile, the value of domestic production was $1,581.68 million, an increase of 6.96% compared to the same period. It is noticeable that the market value of electrical and electronic appliances and the value of production for domestic sales are moving in opposite directions. This is due to the industry being affected by the continuously rising global inflation rate, leading to higher prices of raw materials used in production, as well as increased energy and electricity prices. As a result, Thailand is affected by such inflation, leading to higher prices of consumer goods, which in turn causes the value of sales of electrical and electronic appliances in Thailand to decrease. This is depicted in Figure 1.

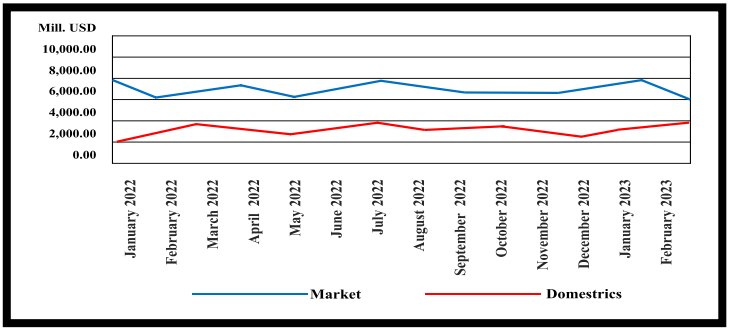

Figure 1: Database of Market and Domestic Sales

Source: Economic Intelligence Center, (2023)

The key issues of the industry include the rising cost of raw materials, overall high production costs, trade barriers imposed by trading partner countries, the trend of shifting production bases, lack of continuous support in research and development of personnel for the production of high-tech products, and the societal issue of an aging population leading to a decreasing number of working-age people (Economic Intelligence Center, 2023). As a result of these challenges, the competitiveness of the Thai electrical and electronics industry has declined. Therefore, entrepreneurs must prioritize human resource capabilities, as Thailand is entering an aging population stage, leading to a labor shortage issue. To prevent this problem, organizations must emphasize sustainable human resource management at all levels. This involves developing employees to adapt to internal and external changing environments efficiently. At the same time, creating motivation for work through clear policies on compensation and providing appropriate welfare to employees is crucial. Additionally, factors related to the organization of learning are vital for sustainable development. Developing and promoting shared understanding within the organization, supporting teamwork, and having a clear strategy for developing employees with high competencies are all essential. As a result, the Thai electrical and electronics industry can compete with low production costs, high-quality products, and highly competent employees. It is an organization that emphasizes learning together to create sustainable efficiency. Due to the importance mentioned above, the researchers are interested in studying Increasing the Competitiveness of the Thai Electrical and Electronics Industry in the Digital Economy Era.

Objective

1. To study the structure and operational characteristics of the Thai electrical and electronics industry in the digital economy era.

2. To study the components of enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era.

3. To develop a structural equation model (SEM) for enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era.

4. To obtain guidelines for increasing the competitiveness of the Thai electrical and electronics industry in the digital economy era.

Conceptual Framework

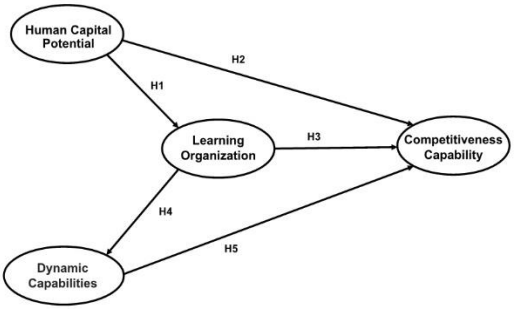

Figure 2 Conceptual Framework

Literature Review

1. Human Capital Potential: Human capital potential arises from the abilities and experiences of individuals, leading to an organization's ability to produce products and services and innovate within the organization. Efficient human capital components include various factors, such as educational and training opportunities to develop expertise and emotionally intelligent individuals who constantly self-improve to become highly competent and innovative contributors to the organization's competitive development and sustainability (Batat, 2022). Similarly, a study by Di Fabio and Kenny (2021) found that organizations with policies supporting employee training and knowledge sharing tend to be more efficient in the

long run, sustaining their businesses. To gain a competitive edge, organizations must provide reasonable compensation and welfare policies to motivate employees to perform to their fullest potential, support employees in various training programs, provide modern and safe working tools, and create a happy work environment. (Byukusenge et al., 2021). Therefore, it can be concluded that Human Capital Potential refers to the hidden capabilities within humans. If recognized and developed, these can enhance human potential, preparing them to effectively apply their skills in an organizational setting to create competitive capabilities. These relationships lead to the following research hypotheses:

H1: Human capital potential has a direct influence on learning organization.

The relationship between Human Capital Potential directly influences competitiveness because it indicates the capability and readiness of an organization, which affects business operations and the organization's survival under constantly changing internal and external environments. Aspects of Human Capital Potential that organizations should prioritize include interpersonal skills, effective communication, teamwork, and adaptability to change. Besides these factors, Investopedia (2017) describes Human Capital Potential as a key factor enabling organizations to rapidly adapt to changes. which differentiates each employee. Each employee can develop through training and further education to enhance their experience and work capabilities, thus adding economic value to the entrepreneur and the overall economic system. This aligns with Nitisan (2021) human capital includes various aspects such as problem- solving skills, communication, intelligence quotient, emotional quotient, personality, physical and mental health. The study by Pruettipong (2021) found that human capital is the most important resource for the public sector, private sector, or state enterprises, with many organizations developing their human capital potential to add value to the organization. Human resources are thus the most valuable asset of an organization as they are the basic factor of production. These relationships lead to the following research hypotheses:

H2: Human capital potential has a direct influence on competitiveness capability.

2. Learning Organization: A concept employed for organizational development, highlighting internal resources' significance in creating added value and securing a competitive edge. Learning leads to corporate innovation and serves as a means to enhance organizational efficiency. Organizations that support employee learning yield sustained profits. Several organizations have recognized the importance of becoming learning organizations and have shifted towards this paradigm to establish a competitive advantage (Chung, 2019). This collective learning has made employees more effective quick to problem-solve creatively and engage in comprehensive planning, all amidst uncertain competitive environments. The concept of a learning organization contributes to enhanced organizational development and competitiveness, fostering innovative thinking to remain competitive within an ever-changing competitive landscape (Safiia, 2019). Critical components of a learning organization include personal mastery, learning from real-world situations, open thinking and perspective, adaptability in work methods, shared vision, team learning, system thinking, communication skills, and effective feedback. Therefore, it can be concluded that Organizational Learning refers to an organization that supports the transfer and exchange of knowledge and experiences within the organization, alongside acquiring knowledge from external sources to develop potential and create competitive capabilities. These relationships lead to the following research hypotheses:

H3: Learning organization has a direct influence on competitiveness capability.

The relationship between Organizational Learning has a direct influence on Dynamic Capabilities, as Organizational Learning is the ability of an organization to perceive, decide, modify, and integrate resources in various capabilities in line with changes in the business environment. This involves prioritizing and supporting the development of skills and knowledge applicable in all situations, consistent with Pulsiri and Vatananan (2021), who found that Organizational Learning is the ability of an organization to integrate, creating and

improving the knowledge and skills of employees both internally and externally, aligned with environmental changes in competition. Additionally, Dynamic Capabilities involve collecting related ideas and creating systematic thought processes, emphasizing resources. Therefore, an organization can create competitive capabilities when it has resources superior to its competitors. Giniuniene and Jurksiene (2015) found that knowledge management and learning processes result in employees having Dynamic Capabilities, as knowledge management helps develop perception and knowledge arising from work experiences, making each employee uniquely capable, contributing to the organization's sustainable competitive capabilities. Farzaneh et al. (2022) found that competitive capabilities arise when employees in an organization exhibit behaviors of seeking and exchanging learning, leading to the organization's Dynamic Capabilities. Therefore, it can be concluded that Organizational Learning is a key factor in creating Dynamic Capabilities to enable an organization's competitive abilities. These relationships lead to the following research hypotheses:

H4: Learning organization has a direct influence on dynamic capability.

3. Dynamic Capabilities: Dynamic capabilities refer to an organization's ability to manage and develop its internal and external capabilities to adapt to rapidly changing environments. These capabilities are crucial for an organization to evolve and improve in response to an ever-changing competitive landscape. An organization's dynamic capabilities are based on several factors, including recognizing external environmental conditions, searching for new opportunities, assessing the readiness of internal resources, and adapting to changes. Dynamic capabilities enable organizations to create and maintain their competitive advantage in the long term by adapting to changes and aligning themselves with consumer preferences (Permatasari et al., 2023). Additionally, dynamic capabilities encompass the ability to perceive differences, explore readiness for internal resources, adapt, and prepare for changes (Aldianto et al., 2021). Therefore, it can be concluded that Dynamic Capabilities refer to an organization's ability to perceive opportunities from both internal and external factors,

enabling the organization to respond quickly to changes in the environment. This includes the use of diverse online social networks and channels to facilitate quick and convenient access to customers, reduce operational costs. These relationships lead to the following research hypotheses:

H5: Dynamic capabilities have a direct influence on competitiveness capability.

4. Competitiveness Capability: Competitiveness capability creates added value for products and services, making it a critical tool for strategic planning and differentiating an organization from competitors. Key factors for enhancing competitiveness include a strategy for cost leadership, adapting to internal and external environmental conditions, and selecting the right strategy for products and services. This implies that organizations must continually adjust and find appropriate competitive strategies, regardless of whether competition increases or decreases. Competitiveness is achieved through having diverse resources and effectively utilizing them. Organizations should establish competitiveness by setting a vision to determine their outstanding standards and policies, serving as a guide to future success. This ensures an organization can maintain its market share, create distinctions, and achieve cost savings through efficient production (Kankam et. al., 2019). Furthermore, competitiveness stems from being an up-to-date, exceptional product leader and building good customer relationships (Danso et. al., 2020). Nevertheless, creating competitiveness is the capability of an organization that competitors cannot easily imitate, and it's the strategy that provides the highest level of stability. Therefore, it can be concluded that Competitiveness Capability refers to the ability to produce goods with low cost and high quality, rapidly develop new products and services to meet future customer needs, and have fast product and service delivery processes. It involves having diverse resources capable of advancing and modernizing the business, along with the use of modern technology and a focus on social media to enable the organization to achieve high profitability.

Research Methodology

This research is inductive research, utilizing a mixed- methodology approach, incorporating both qualitative and quantitative research methods. The steps are as follows:

1. Quantitative research: the data was collected through a questionnaire. population and sample group: the population consisted of entrepreneurs or managers in the electrical and electronics industry with the total number of 2,785 businesses registered through the Electrical and Electronics Institute in the fiscal year 2021. The sample size is determined based on structural equation modeling analysis, with a very good level of 500 samples (Silpcharu, (2017). The sampling is done using probability sampling, where every individual in the entire population has an equal chance of being selected, employing simple random sampling techniques.

Research tools: The Questionnaire divided into two parts, as follows:

Part 1 of the questionnaire deals with the structure and operational characteristics of the Thai electrical and electronics industry in the digital economy era. It is structured as a checklist with ten items.

Part 2 of the questionnaire focuses on components of enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era. It includes four components: human resource potential (20 items), learning organization (20 items), dynamic capability (20 items), and competitiveness capability (20 items) The questionnaire is designed as a rating scale, with a 5-level weighting criterion following the Likert scale. The researcher's approach to creating the questionnaire involves seven steps: Step 1: Studying guidelines for creating a questionnaire based on the conceptual framework; Step 2:Studying related information from books, documents, articles, and related works as the guidelines for writing question items; Step 3: Setting subject matter and limits of question items based on the objectives and benefits of the study; Step 4: Creating a draft questionnaire: the research developed a questionnaire based on relevant literature, including Farzaneh et. al. (2021), Correia et. al. (2022), Hizarci and Katrinli (2021), Arun and Yildirim (2022), Lardon et. al. (2022); Step 5: Assess the tool's quality by

checking content validity. The draft questionnaire is reviewed by five experts to assess its quality using the Index of Item–Objective Congruence (IOC), ranged from 0. 80 to 1.00, which exceeds the 0.50 threshold, indicating that the questions align with the research objectives according to the criteria of Rovinelli and Hambleton (1977) ; Step 6: Check for reliability by testing the content-validated questionnaire on a try-out session involving a group of 30 people (not part of the sample group) and calculating the Cronbach's Alpha Coefficient, resulting in a questionnaire score of 0. 95. It includes four components: human resource potential (0. 84), learning organization (0.96), dynamic capability (0.89), and competitiveness capability (0.88), exceeding the 0. 70 standard and indicating high reliability according to the criteria of Nunnally and Bernstein (1978); Step 7: Improving and correcting the questionnaire based on the results of discrimination index and questionnaire reliability analysis before implementation.

Statistical Analysis: The data was analyzed using descriptive statistics, including frequency distribution and percentage calculation. For the 5-level rating scale, the mean and standard deviation were calculated. Additionally, multivariate statistics were used for structural equation modeling (SEM), utilizing the AMOS software for advanced statistical data analysis. by considering the criteria of Arbuckle (2016) and Diamantopoulos and Siguaw (2000) which uses the criteria to consider the conformity index, as shown in Table 1.

Table 1 The criteria to consider the conformity index

Evaluating the Data–Model Fit	Criteria	Reference
CMIN–p (The chi-square probability level value)	More than 0.05	Arbuckle (2016)
CMIN/DF (Relative chi-square value)	Less than 2.00	Arbuckle (2016)
GFI (Conformity Index)	More than 0.90	Arbuckle (2016)
RMSEA (Root Mean Square Error of Approximation)	Less than 0.08	Arbuckle (2016)

Table 1 (Continue)

Evaluating the Data–Model Fit	Criteria	Reference
CFI (Comparative Fit Index)	More than 0.90	Diamantopoulos and Siguaw (2000)
NFI (Normed Fit Index)	More than 0.90	Diamantopoulos and Siguaw (2000)
TLI (Tucker Lewis index)	More than 0.95	Diamantopoulos and Siguaw (2000)
RMR (Root Mean Squared Residual)	Less than 0.05	Diamantopoulos and Siguaw (2000)

2. Qualitative research: The sample group consists of 9 entrepreneurs or managers from 3 different groups, selected using Purposive Sampling. This includes 3 individuals from the manufacturing industry, 3 from the public sector, and 3 academics, with data collected through in-depth interviews.

Research tools: Structured interviews with open-ended aspects, where the researcher has prepared an interview guide with four main components: human capital potential, learning organization, competitiveness capability, and dynamic capabilities.

Statistical Analysis: In-depth interviews were conducted, and content analysis was used to synthesize the findings into guidelines for Increasing the Competitiveness of the Thai Electrical and Electronics Industry in the Digital Economy Era.

The Result of the Study

Structure and Operational Characteristics: Most organizations had been operating for 10-20 years (52.15%). Thai investors were the most prominent in the business ownership

structure (50.90%). The primary funding source for these organizations came from financial institutions (61.20%). Most organizations were established as limited companies (63.40%). There is a decentralized management structure in business operations as a cluster (49.36%). Additionally, there is a focus on organizational learning where continuous training of employees is prioritized (60.20%). Leadership development at various levels is emphasized, focusing on creating experiences, comprehensive knowledge, and expertise in business operations (55.25%). Technology and innovation are used to enhance productivity (60.00%). There is a clear and structured operational management system (44.50%). A factor influencing competitiveness is the bargaining power of buyers (55.25%).

The Results of analysis of the importance of components: The overall significance level was rated as high ($\overline{X}$= 4.12, S.D. = 0.69). When considering individual aspects, all components were found to be highly significant, ranked in the following order of importance: Human resource potential was highly significant ($\overline{X}$= 4.59, S.D. = 0.58), followed by the Learning organization aspect, which was also highly significant ($\overline{X}$ = 4.19, S.D. = 0.74), Dynamic capability had a high level of significance ($\overline{X}$= 4.07, S.D. = 0.69), and Competitiveness capability was highly significant as well ($\overline{X}$ = 4.05, S.D. = 0.80).

The results of the structural equation modeling analysis: Structural Equation Model (SEM) analysis resulted in the Comparative Fit Index (CMIN-ρ) having a value of 0.158, more significant than 0.05, indicates that the model is not statistically significant. The Comparative Fit Index divided by the Degrees of Freedom (CMIN/DF) was 1.139, less than 2.00. The Goodness-of-Fit Index (GFI) had a value of 0.953, exceeding 0.90. The Root Mean Square Error of Approximation (RMSEA) was 0.017, less than 0.08. The Comparative Fit Index (CFI) was 0.972, greater than 0.90, the Normed Fit Index (NFI) was 0.948, greater than 0.90, the Tucker Lewis Index (TLI) was 0.969, greater than 0.90, and the Root Mean Squared Residual (RMR) was 0.013, less than 0.05. The results are shown in Figure 3 and Table 2.

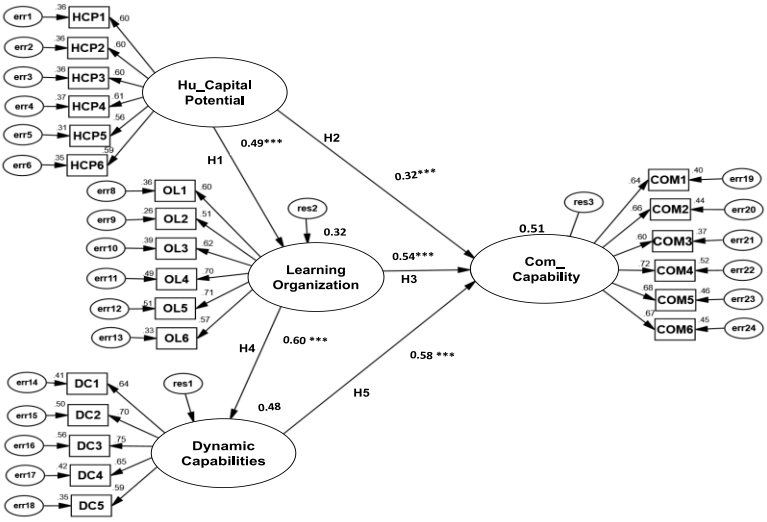

Figure 3: Structural Equation Model

Table 2 The results of the structural equation modeling analysis

Evaluating the Data–Model Fit	Criteria	Results
CMIN–p (The chi-square probability level value)	More than 0.05	0.158
CMIN/DF (Relative chi-square value)	Less than 2.00	1.139
GFI (Conformity Index)	More than 0.90	0.953
RMSEA (Root Mean Square Error of Approximation)	Less than 0.08	0.017
CFI (Comparative Fit Index)	More than 0.90	0.972
NFI (Normed Fit Index)	More than 0.90	0.948
TLI (Tucker Lewis index)	More than 0.95	0.969
RMR (Root Mean Squared Residual)	Less than 0.05	0.013

Remark: *** Significant Level at 0.001

For the results of the structural equation analysis of the components after improving the model, there are consisting of the 4 latent variables and 23 observational variables which can be described as follows. The Human Capital Potential (HCP) component consists of 6 observational variables that have a direct influence on The Learning Organization (OL) component which has a variance value of 0.25, a weight (Standardized Regression Weight) of 0.49, with statistical significance at the level of 0.001, a multiple squared correlation value (R2) of 0.32 and has a direct influence on side elements Competitiveness Capability (COM) has a variance value of 0.07, a weight value (Standardized Regression Weight) of 0.32, with statistical significance at the level of 0.001, and a multiple squared correlation value (R^2) of 0.51.

The Learning Organization (OL) component consists of 6 observational variables that have a direct influence on side elements Competitiveness Capability (COM) has a variance value of 0.06, a weight (Standardized Regression Weight) of 0.54, with statistical significance at the level of 0.001 and a multiple squared correlation value (R^2) of 0.51 and has a direct influence on the Dynamic Capabilities component (DC) has a variance value of 0.10, a weight (Standardized Regression Weight) of 0.60, with statistical significance at the level of 0.001, and a multiple squared correlation value (R^2) of 0.48.

The Dynamic Capabilities (DC) component consists of 5 observational variables that have a direct influence on side elements Competitiveness Capability (COM) has a variance value of 0.11, a weight (Standardized Regression Weight) of 0.58, with statistical significance at the level of 0.001, and a multiple squared correlation value (R^2) of 0.51. For side elements Competitiveness Capability (COM) consists of 6 observational variables with a variance of 0.13. The results are shown in Table 3.

Table 3 Observational Variables

Variable	Variance	Standard	R^2	p
Human Capital Potential (HCP) ⟶ Learning Organization (OL)	**0.25**	**0.49**	**0.32**	***
Human Capital Potential (HCP) ⟶ Competitiveness Capability (COM)	**0.07**	**0.32**	**0.51**	***
HCP1: Creates an open environment to access information, offering opportunities to recognize and learn from various sources to enhance it.	0.36	0.60	0.29	***
HCP2: Clearly defines roles and responsibilities within the organization according to knowledge and expertise.	0.36	0.60	0.33	***
HCP3: Provides a conducive working environment with convenient amenities and necessary tools and equipment.	0.36	0.60	0.46	***
HCP4: Incorporates up-to-date technology, tools, and machinery into production to streamline various tasks.	0.37	0.61	0.38	***
HCP5: Promotes and supports employee participation in seminars and training programs to enhance skills and knowledge according to their job roles.	0.31	0.56	0.37	***

Variable	Variance	Standard	R^2	p
HCP6: Implements a safe work control system to reduce workplace accidents and minimize operational losses.	0.35	0.59	0.37	***
Learning Organization (OL) ⟶ Competitiveness Capability (COM)	**0.06**	**0.54**	**0.51**	***
Learning Organization (OL) ⟶ Dynamic Capabilities (DC)	**0.10**	**0.60**	**0.48**	***
OL1: Improves or develops work processes from traditional to efficient and suitable patterns.	0.36	0.60	0.33	***
OL2: Prioritizes employee learning throughout the organization to create competitive competence and profitability.	0.26	0.51	0.40	***
OL3: Encourages open collaboration among staff, customers, and stakeholders.	0.39	0.62	0.50	***
OL4: Employees accept change willingly, continually learn, develop their competencies, exhibit creativity, and innovate in their roles.	0.49	0.70	0.40	***
OL5: Encourages and supports continuous learning and innovative thinking to foster different thinking patterns.	0.51	0.71	0.30	***
OL6: Prioritizes learning to create competitiveness and sustainable growth.	0.33	0.57	0.49	***

Variable	Variance	Standard	R^2	p
Dynamic Capabilities (DC) ⟶ Competitiveness Capability (COM)	**0.11**	**0.58**	**0.51**	***
DC1: Segment customers to understand the diverse needs of different customer groups and efficiently tailor marketing programs to meet customer needs.	0.41	0.64	0.41	***
DC2: Utilizes various online social networks to ensure convenient and rapid customer access.	0.50	0.70	0.35	***
DC3: Produces innovative products and services to cater to the varied demands of all customer segments.	0.56	0.75	0.30	***
DC4: Tracks the patterns of service usage and actively welcomes valuable feedback and suggestions to improve service alignment with customer needs.	0.42	0.65	0.38	***
DC5: Focuses on implementing new technology for faster, timely, and improved work performance.	0.35	0.59	0.41	***
Competitiveness Capability (COM)	**0.13**	-	-	-
COM1: Allocates a budget to enhance competitiveness and ensure efficient achievement of operational objectives.	0.40	0.64	0.31	***

Variable	Variance	Standard	R^2	p
COM2: Focuses on developing new and outstanding work processes, responding promptly to customer needs.	0.44	0.66	0.39	***
COM3: Analyzes future customer needs to plan operations efficiently.	0.37	0.60	0.30	***
COM4: Continuously analyzes the internal and external environment to adjust and adapt to evolving customer needs.	0.52	0.72	0.29	***
COM5: Increases revenue compared to the previous year by retaining old customers and acquiring new ones.	0.46	0.68	0.34	***
COM6: Promotes collaborative learning organization to advance innovative thinking and develop existing innovations for maximum organizational benefit.	0.45	0.67	0.30	***

Remark: *** Significant Level at 0.001

The analysis of direct and indirect influences shows that the three independent variables in the model (Human Capital Potential, Learning Organization, and Dynamic Capabilities) explain 51% of the variance in the dependent variable, Competitiveness Capability. These independent variables have both direct and indirect (through other variables) positive statistical influences on Competitiveness Capability at a significance level of .01. Among them, Learning Organization has the highest total effect (TE), followed by Dynamic Capabilities. In contrast, Human Capital Potential has an equal total effect (TE) as Dynamic Capabilities. Therefore, Learning Organization is the most influential or significant factor in Competitiveness Capability, followed by Dynamic Capabilities and Human Capital Potential. The results are shown in Table 4.

Table 4 Statistics of Direct and Indirect Effects Analysis

Latent Variables	R^2	Effect	HCP	OL	DC
COM	0.51	DE	0.32 ***	0.54 ***	0.58 ***
		IE	0.26 ***	0.35 ***	0.00
		TE	0.58 ***	0.89 ***	0.58 ***
OL	0.32	DE	0.49 ***	-	-
		IE	0.00	-	-
		TE	0.49 ***	-	-
DC	0.48	DE	-	0.60 ***	-
		IE	-	0.00	-
		TE	-	0.60 ***	-

Remark: *** P < .01; DE= direct effect; IE=indirect effect; TE=total effect

Hypothesis Testing Results

The structural equation model of enhancing the competitiveness of the Thai electrical and electronics industry in the digital economy era with five hypotheses found that the hypotheses were supported as stated. The results are shown in Table 5.

Table 5 Research Hypothesis

Research Hypothesis	Testing Result
H1: Human capital potential has a direct influence on learning organization.	Accepted
H2: Human capital potential has a direct influence on competitiveness capability.	Accepted
H3: Learning organization has a direct influence on competitiveness capability.	Accepted
H4: Learning organization has a direct influence on dynamic capability.	Accepted
H5: Dynamic capabilities have a direct influence on competitiveness capability.	Accepted

Guidelines for increasing competitiveness: using the In-Depth Interview method of experts. The results of the interviews can be summarized as follows.

Human Capital Potential: Employees utilize various communication tools connected to the online community to support their work practices, having skills in organizing and categorizing essential information and encouraging the use of social media as a learning and self-development channel. The employees have

been allowed to freely connect their laptops, tablets, and smartphones to the organization's databases and operating systems as supplementary tools in the workplace, ensuring convenience and flexibility in carrying out tasks from anywhere at any time enhancing employees' adaptability and efficiency. Employees within the organization receive necessary training courses, equipping them with problem-solving skills using innovative methods. They can seamlessly step in for one another when necessary and possess effective communication and feedback skills, reducing errors in work practices and improving output quality. This approach reduces operational costs and enhances competitiveness.

Learning Organization: A modern and innovative management approach is in place, which involves continuous development based on knowledge and understanding. Emphasis is placed on transforming traditional thinking into new ideas, and employees are constantly developed in knowledge, skills, and expertise with a strong focus on actual learning. Tasks are assigned systematically to employees, and there are straightforward working methods that can adapt to changing circumstances as needed. Opportunities are provided for employees to participate in collaborative work planning to achieve excellence, and learning from real problems or situations is encouraged. This knowledge is then applied in the future to reduce errors that may occur. The organization defines a shared vision among its leaders, stakeholders, and employees to ensure everyone's involvement in shaping its future.

Dynamic Capabilities: Consumer data is collected from employees, management, customers, suppliers, intermediaries, and stakeholders to predict future consumer behavior. Skills are shared and exchanged collaboratively, and many employees possess practical communication abilities and understand their roles and responsibilities. Knowledge derived from past experiences is applied and developed in current work, and practical efforts are made to achieve the best results. Continuous profitability is generated and aligned with the organization's goals, and effective adaptation to environmental changes is achieved. Learning occurs externally and internally, focusing on personnel development and fostering diverse knowledge creation, leading to innovation. This ensures that the organization remains ready and competitive at all times.

Competitiveness Capability: Employees are encouraged to exchange ideas, consider problems, and find the most suitable solutions to better meet customer needs compared to competitors. There is a readiness to change strategies in competition, enabling the organization to plan and act in the right direction. Innovation is employed to improve operational processes, develop products and services, and enhance employee knowledge in line with changing consumer behavior. Quick customer service is provided, and up-to-date technology is applied across all departments within the organization, with an analysis of consumer behavior aided by technology to track purchasing and service-related behavior. Efficient cost management is a strength in business operations, ensuring consistent profitability and effective market share maintenance.

Discussion

Analysis of the General Characteristics of the Organizations revealed the following key findings: The research on the general characteristics of organizations found that they have been operating for 10-15 years, are predominantly Thai-owned, use financial institutions for funding, are established as limited companies, and mostly have offices located in Thailand. There is a decentralized management structure in business operations as a cluster. Additionally, there is a focus on organizational learning where continuous training of employees is prioritized. Leadership development at various levels is emphasized, focusing on creating experiences, comprehensive knowledge, and expertise in business operations. Technology and innovation are used to enhance productivity. There is a clear and structured operational management system. A factor influencing competitiveness is the bargaining power of buyers.

The level of importance of each element to increase competitiveness: The overall result was at a high level. When considering each item, it was found that all the components were at a high level. Ranged in the following order of importance: human resource potential was followed by learning organization, dynamic capability, and competitiveness capability respectively.

Development of structural equation modeling (SEM): All elements are related in a positive direction. There can be explained as follows.

Human capital potential directly influences Learning organization: given that the organization has policies to encourage and train employees to be innovative and contribute to its development. Precise and efficient work procedures have been established to meet current and future customer needs, allowing easy and widespread access to technology for work within the organization. This aligns with Ismail's (2023) study, which found that human capital development should begin from within the

organization. It should involve assessing the knowledge and abilities of employees to determine their alignment with assigned responsibilities. Moreover, attitudes and behaviors demonstrated by employees significantly impact work success. Therefore, employee development should focus on training and development while creating motivation through overall welfare system improvements (Batat, 2022).

Human capital potential directly influences competitiveness capability: because the organization provides a favorable working environment with convenience, safety equipment, and contemporary technology to reduce the complexity of various work processes. This aligns with Di Fabio and Kenny's (2021) findings, who emphasized that organizations with policies supporting training and encouraging employees to collaborate and share knowledge and experiences ultimately lead to long-term efficiency, sustainable business operations, and enhanced problem-solving. Such policies foster a culture of learning and collective problem-solving within the organization, starting from top management to operational levels, making employees engaged and dedicated to the organization and contributing to their full potential (Singh, 2022).

Learning organization directly influences competitiveness capability: because it allocates budgets to foster competitiveness, ensuring it can effectively achieve its operational objectives. Moreover, it emphasizes developing and improving innovative work processes that outperform competitors, efficiently meeting current and future customer requirements. This aligns with the findings of Lardon et. al. (2022), who noted that employees with high social media knowledge, enriched through training, can enhance work quality to surpass competitors. Furthermore, the organization analyzes future requirements, using this information to plan and accomplish goals and objectives efficiently. Consistent with Lee and Meng (2021), organizations view learning as a critical factor in creating competitiveness and organizational survival. Moreover, the

learning organization efficiently manages business operations within a competitive global market, following market dynamics (Correia et. al., 2022).

Learning organization directly influences dynamic capability: because the organization continuously improves or develops work processes from traditional to modern and efficient models. It emphasizes the importance of employee learning throughout the organization to create competitiveness, ensure survival, and enable freedom in communication and openness among all personnel, customers, and stakeholders. Furthermore, it segments customers to understand their diverse needs and strategically plans marketing programs to cater to these needs effectively, consistent with the findings of Farzaneh et. al. (2021). The organization utilizes various online social networks for convenient and rapid customer access. In line with Yahia Marzouk and Jin's (2023) study, the organization maintains up-to-date databases, provides continuous employee training, encourages knowledge-sharing among departments, and efficiently applies this knowledge to improve work performance.

Dynamic capabilities directly influence competitiveness capability: because the organization continuously analyzes changes in both internal and external environments to adapt, develop, and respond to evolving customer demands. This leads to increased revenue from operations compared to the previous year. The organization can retain and attract existing customers while promoting collaborative learning to enhance innovative thinking and utilize existing innovations for maximum benefit. These findings align with the study conducted by Arun and Yildirim (2022). Consistent with the research of Quansah and Salipante (2022), leadership capabilities play a crucial role in linking the organization's competitiveness. They support continuous learning to enhance efficient performance, reduce work errors, cut costs, and save resources.

Approaches to enhancing competitiveness through in-depth interviews: under the scope and content comprising human resource potential, learning organization,

dynamic capability, and competitive capability revealed that all four components can aid the competitiveness of the electrical and electronics industry. This is because organizations have shifted their work models from traditional to new ones through social media platforms, enabling work from any location and at any time. This transition has significantly reduced operational errors and costs. Furthermore, there has been an adoption of modern and advanced technologies for product and service development, as well as support and development of employees to enhance their knowledge and expertise in technology use, thereby improving the quality and efficiency of the output.

New Finding

The study employed a mixed- methodology approach, incorporating both quantitative and qualitative research. The research indicates that factors affecting competitiveness capability in the digital economy extend beyond the scope of this study and include five additional elements: 1) Business partnerships: Refers to the collaboration of businesses, involving two or more organizations coming together to provide mutual aid, exchange resources, and create opportunities for sustainable growth. 2) Strategic management: Involves establishing a systematic approach to organizational leadership, which includes planning, executing plans, controlling, and efficiently assessing work in line with set objectives. 3) Personnel competence: Pertains to employees having adequate knowledge for efficient job performance. It involves having the technical skills required, the ability to communicate and transmit instructions effectively, and general competencies relevant to their respective positions. 4) Digital marketing: Encompasses skills to understand and leverage existing digital technologies to promote products and services through various online channels to a global audience, increasing long- term competitiveness. 5) Technology and innovation: Involves utilizing technology and

innovation to reduce costs, enhance production efficiency, and improve product and service quality, ensuring alignment with current and future market demands, as depicted in Figure 4.

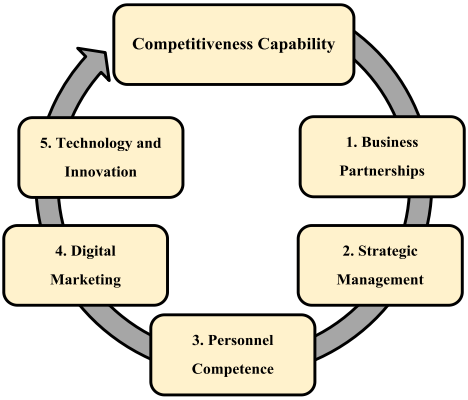

Figure 4: Competencies in Digital Economy Competitiveness

Research Recommendations:

1. Recommendations from the Research

1.1 Human Capital Potential The aspects that need development are as follows: 1) Recruitment and Selection: The organization should have clear criteria for recruiting and selecting employees, with diverse selection formats to match the job positions effectively. 2) Development and Training: Training and development for employees should reduce operational errors, improve product quality, lower operational costs, and enhance employee performance. 3) Performance Evaluation: Organizations should establish transparent and equitable criteria for performance evaluations, emphasizing success resulting from employee capabilities. The results of evaluations should be communicated to employees after the

evaluation process. 4) Compensation and Benefits: The organization should provide compensation that aligns with the current economic conditions and the quality of work that employees deliver.

1.2 Learning Organizational The aspects that need development are: 1 Commitment to Learning: Management should emphasize knowledge exchange within the organization and consider learning a critical factor in enhancing competitiveness. 2) Shared Vision: Establishing a shared vision within the organization, collectively decided upon by leadership, stakeholders, and employees, ensures employee involvement in shaping the organization's future. 3) Open-Mindedness: Effective leadership should encourage effective problem-solving, support, and productive exchange of ideas and opinions within the organization. 4) Knowledge Sharing: The organization should have leaders who promote employee input and avoid criticizing different opinions.

1.3 Dynamic Capabilities The aspects that need development are: 1) Organizational Policies: Employees should have more say in setting job goals than just receiving orders from superiors. 2) Job Characteristics: The organization should delegate authority to knowledgeable and dedicated employees who can efficiently perform their jobs. 3) Organizational Management: Efficiently utilizing available resources in the organization, aiming for productivity, should be planned.

1.4 Competitiveness Capability The aspects that need development are 1) Digital Marketing, 2) Customer Focus, 3) Internal Processes, and 4) Profitability.

2. Recommendations for Future Research

2.1 There should be a study on developing competitiveness capabilities for the long term in the digital economy era, as the social, political, economic, and technological environments change over time. This will enable industries to progress with the world and compete in the modern era. Additionally, there should be research on the desired human capital competencies of entrepreneurs to develop labor skills that align with the needs of entrepreneurs

and are ready for producing high-quality goods and supporting the use of more efficient technologies, thereby increasing value and global competitiveness.

2.2 There should be a study on the factors of digital technology, as it is a crucial driver in transitioning from traditional, labor-intensive production structures to innovative production that focuses on value addition and low investment. This includes maintaining brand image and developing environmentally friendly products that align with consumer behavior of each group, using innovative technology in the production process to ensure accuracy, speed, and alignment with the needs of the current and future target markets.

2.3 The conceptual framework from this research should be applied to other industrial sectors to compare differences and use as guidelines for organizational development, creating a competitive advantage in the global market. There should also be a study of other factors that directly and indirectly affect competitive advantage, beyond this research.

References

Aldianto, L., Anggadwita, G., Permatasari, A., Mirzanti, I.R. and Williamson, I.O. (2021). Toward a business resilience framework for startups. *Sustainability, 13*(6), 1-19.

Arbuckle, J. L. (2016). *AMOS 20.0 users guide*. Crawfordville, FL: Amos Development Corporation.

Arun, K. and Yildirim Ozmutlu, S. (2022). Narratives of environmental munificence of 3PL firms on the relationship between dynamic capabilities, strategic management and organizational performance. *Journal of Strategy and Management*, *15*(1), 96-118.

Batat, W. (2022). The employee experience (EMX) framework for well-being: an agenda for the future. *Employee Relations, 44(*5), 993-1013.

Byukusenge, E., Munene, J. C., & Orobia, L. A. (2021). Managerial competencies and business performance: innovation as a mediator in Rwandan SMEs. *International Journal of Law and Management, 63*(5),445-463.

Chung, K. L. (2019). *The emerging dynamic social learning theory of a learning community of practice: Abbey gardens, ontario, Canada.* (Doctoral dissertation).

Correia, R.J., Teixeira, M.S. and Dias, J.G. (2022). Dynamic capabilities: antecedents and implications for firms performance. *International Journal of Productivity and Performance Management*, *71*(8), 3270-3292.

Danso, A., Adomako, S., Lartey, T., Amankwah-Amoah, J. and Owusu-Yirenkyi, D. (2020). Stakeholder integration, environmental sustainability orientation and financial performance. *Journal of Business Research,11*(9), 652-662.

Di Fabio, A. and Kenny, M.E. (2021). Connectedness to nature, personality traits and empathy from asustainability perspective. *Current Psychology*, *40*(3), 1095-1106.

Diamantopoulos, A. & Siguaw, J. A., (2000). *Introduction to LISREL:A guide for the uninitiated.* London: SAGE Publications, Inc.

Economic Intelligence Center. (2023). Retrieved from https://www.scbeic.com/th/detail/file/product/8407/gbyx 8tbcbk/ Industry-Insight_Electronics-2022_20220725.pdf.

Electrical and Electronics Institute. (2022). Retrieved from https://eiu.thaieei.com/Content/box/ Research/127% 20New%20Deal_2023-09-18_154948117.pdf

Farzaneh, M., Ghasemzadeh, P., Nazari, J.A. and Mehralian, G. (2021). Contributory role of dynamic capabilities in the relationship between organizational learning and innovation performance. *European Journal of Innovation Management*, *24*(3), 655-676.

Farzaneh, M., Wilden, R., Afshari, L., & Mehralian, G. (2022). Dynamic capabilities and innovation ambidexterity: The roles of intellectual capital and innovation orientation. *Journal of Business Research*, *148*, 47-59.

Giniuniene, J., & Jurksiene, L. (2015). Dynamic Capabilities, Innovation and Organizational Learning: Interrelations and Impact on Firm Performance. *Procedia - Social and Behavioral Sciences, 213*, 985-991.

Hizarci Payne, A.K. and Katrinli, A. (2021). Microfoundations of firm capabilities in the context of international business: Exploring the role of export department employees. *Management Research Review*, *44*(1), 59-93.

Investopedia. (2017). Retrieved from https://www.investopedia.com/terms/h/humancapital.asp#ixzz4z9hVMalf

Ismail, I.J. (2023). Speaking to the hearts of the customers! The mediating effect of customer loyalty on customer orientation, technology orientation and business performance. *Technological Sustainability*, *2*(1), 44-66.

Kankam-Kwarteng, C., Osman, B. and Donkor, J. (2019). Innovative low-cost strategy and firm performance of restaurants: The moderation of competitive intensity. *Asia Pacific Journal of Innovation and Entrepreneurship, 13*(3), 266-281.

Kaur, V (2019). Knowledge-Based Dynamic Capabilities: The Road Ahead in Gaining Organisational Competitiveness (1st ed.). Cham, Switzerland: Springer International Publishing.

Kaur, V (2019). Knowledge-Based Dynamic Capabilities: The Road Ahead in Gaining Organisational Competitiveness (1st ed.). Cham, Switzerland: Springer International Publishing.

Kaur, V (2019). Knowledge-Based Dynamic Capabilities: The Road Ahead in Gaining Organisational Competitiveness (1st ed.). Cham, Switzerland: Springer International Publishing.

Kaur, V (2019). *Knowledge-Based Dynanic Capabilities: The Road Ahead in Gaining Organisational Competitiveness* (1st ed.). Cham, Switzerland: Springer International Publishing.

Lardón-López, M.E., Martín-Rojas, R. and García-Morales, V.J. (2022). Social media technologies: a waste of time or a good way to learn and improve technological competences. *Journal of Knowledge Management*, *26*(11), 348-377.

Lee, J. J., & Meng, J. (2021). Digital competencies in communication management: A conceptual framework of Readiness for Industry 4.0 for communication professionals in the workplace. *Journal of Communication Management, 25*(4), 417-436.

Nitisan Phongpiyaphaiboon. (2564). *The most worthwhile investment in human capital development*. prachachat *30*(5): 1-2

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed). New York: McGraw-Hill.

Permatasari, A., Dhewanto, W. and Dellyana, D. (2023). The role of traditional knowledge-based dynamic capabilities to improve the sustainable performance of weaving craft in Indonesia. *Journal of Enterprising Communities: People and Places in the Global Economy.17*(3), 664-683.

Pruettipong Chakkaphak. (2021). Human capital development approach in public administration. *Journal of MCU Social Science*, *10*(2): 355-363

Pulsiri, N., & Vatananan-Thesenvitz, R. (2021). Triangle relationship: A Review of dynamic capabilities, strategic foresight, and organizational learning. *International Journal of Business Environment*, *5*(3), 1-18.

Quansah, E., Hartz, D.E. and Salipante, P. (2022). Adaptive practices in SMEs: leveraging dynamic capabilities for strategic adaptation. *Journal of Small Business and Enterprise Development*, *29*(7), 1130-1148.

Rovinelli, R. J., & Hambleton, R. K. (1977). *On the use of content specialists in the assessment of criterion referenced test item validity*. Dutch Journal of Educational Research, (2), 49-60.

Safiia, M. (2019). A quantitative approach to capture managers' perceptions of organizational learning and organizational innovativeness in a private higher education institution.

Silpcharu, T. (2017). *Statistical research and analysis with SPSS and AMOS.* (15th ed.). Bangkok: Business R&D. (In Thai).

Singh, A. (2022). Work engagement, affective commitment, and career satisfaction: the mediating role of knowledge sharing in context of SIEs. *Benchmarking: An International Journal, 26*(6), *1692-1708.*

YahiaMarzouk, Y. and Jin, J. (2023). Renew or die amidst COVID-19: investigating the effect of organizational learning culture on strategic renewal through strategic reconfiguration and digital transformation. *Journal of Organizational Change Management*, *36*(5), 777-811.