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Transformative Business Approaches of Electronic Component Manufacturers in the Era of Industry 4.0: A Psychological Study

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ABSTRACT

This study aimed to investigate the business landscape, the structure of management strategies, and service approaches among small and medium-sized enterprises (SMBs) operating in the electronic components manufacturing sector during the Industry 4.0 era. The research collected data from 350 executives and entrepreneurs within Thailand's electronic components industry, using a questionnaire as the research tool. The data analysis encompassed metrics such as frequency, percentage, average, standard deviation, and factor analysis. The majority of respondents were male, falling in the age range of 36 to 40, possessing a Bachelor's degree in business administration, having a tenure of 11 to 15 years within the same company. These respondents were engaged in distributing electronic components, often participating in joint ventures with foreign partners. Their companies typically had 51 to 100 employees, assets valued between 6 to 8 million baht, imported raw materials constituting 1 to 10 percent of production costs, and exported products within the range of 1 to 10 percent. Notably, their performance had declined compared to the previous year. The study determined that the overall management strategy of the organizations under scrutiny was at a high level, rated at 4.0. The most critical factors in this strategy, in descending order, were work satisfaction, economic considerations, quality maintenance, leadership, planning, coordination, just-in-time practices, and technology integration. Control and organizational administration held moderate importance. The SMB management strategies among electronic component manufacturers during the Industry 4.0 era were found to comprise five core components and twenty-five subcomponents. These components included the management of organizational quality, cost-efficient planning, coordination, as well as command and control functions.

Keywords: Management Strategy, Electronics, Industry 4.0, Psychological Study

INTRODUCTION

Context of the Industrial Revolution 4.0 (Shen and colleagues, 2020). It is a technical improvement in the sector (Allal-Chérif, 2022). This enables the collection and analysis of machine data. Make the manufacturing sector more efficient and resilient so that it can produce goods more efficiently. 4.0. It will revolutionize productivity to improve productivity. Drive the economy and assist with industrial expansion. However, this change has raised awareness of the hazards. This may have an impact on workers who need to be informed and prepared. Working with robots and artificial intelligence, as well as adapting to changes in the industrial era, requires the right mentality and abilities. In this specific Thailand Innovation (Wang et al., 2022), 4.0 is replacing. This change (Ili et al., 2022; Li et al., 2022; Yigitcanlar et al., 2022) will take time, depending on the availability of resources in each firm. By training individuals for new tasks and focusing on prior employees with the essential labor skills of the industrial period. 4.0 will develop and produce jobs by providing a competitive edge in the tool sector (Ammar et al., 2022). The industry's study into the production model for sharpening cutting tools for manufacturing processes that require high precision electrical components manufacture auto components parts supports industrial applications. Aerospace both domestically and worldwide, as well as to investigate distribution channel choices for the firm's competitive edge. In this day and age of digital marketing, Media is often used in product presentations. Differentiation Adding value to things to attract customers in a highly competitive environment is

the subject of this inquiry (Chirumalla et al., 2018; Popa et al., 2018). This will enable business owners to use the data as a guideline for developing and enhancing their operations in order to make future changes. Each type of electronic product manufactured (Alteneiji et al., 2022; Kawahara et al., 2013) in Thailand has a unique export potential on the global market, with the most significant product category and the largest export value is HDD and IC (total share accounted for 50% of the export value of Thai electronic products), with HDD being an integral part of the global computer industry's supply chain (Supply Chain). As a consequence of multinational firms migrating to Thailand and continuing to invest in the country, Thailand has risen to the top of the world in the production and export of computer components. As a result, the Thai industrial structure shifted away from keyboards and other low-value computer components. Monitors have grown into HDDs, which are manufactured using innovative technology and expert labor in Thailand. Despite the fact that the vast majority of them are investing in international export manufacturing. However, the slow shift may impede global market competitiveness (Kim, 2021; Kirtiş & Karahan, 2011; Olejnik & Krammer, 2002; Zhu et al., 2022).

Thailand's electronics sector is expected to restart growing in 2021-2023 (Ammar et al., 2022). As a consequence of the global economy's recovery (the IMF predicts that the global economy will grow by 5.5% in 2021 and 4.2% in 2022) as a result of several countries' economic stimulus efforts and vaccine research success The COVID -19 vaccine (Singh et al., 2022), which has been gradually administered to patients in various countries around the world since late 2020, should help in gradually easing the pandemic situation, but due to the period's increased demand, there are few available electronic items. As a result of the lockdowns in a number of nations, manufacturing has resumed, and it is anticipated that the revenue of Thailand's electronics industry will increase between 2021 and 2023(Yadav & Rahman, 2017). As a result of the worldwide economic recovery, there was an increase in demand for electrical devices according to the development (Blasi et al., 2022; Chang & Lai, 2021; Duygan et al., 2022; Girish et al., 2022; Hajek et al., 2022)of contemporary technologies Global Circuit Board and Component Manufacturers' Megatrends Expect Export Value IC will expand steadily sales-driven variables Semiconductor. The expansion of the planet is anticipated to be favorable. As a result of the COVID-19 epidemic, demand for electronic equipment, particularly in the Internet of Things (IoT) sector, has increased, as have the number of data centers. The development of smart vehicles and 5G telecommunications is promising and fast expanding (considering the future investment in global 5G network infrastructure, it is projected to increase dramatically), which will raise the demand for electronic items in particular. IC tends to increase continuously. However, entrepreneur IC and subcontractor in Thailand must expedite the growth of manufacturing in order to stay up with quickly evolving technology and satisfy consumer demand. Superior integrated circuits consequently, there may be a rise in investment expenses. Competitors like Vietnam have lower labor costs and greater manufacturing (Austin et al., 2021) growth. It may undermine the industry's performance and competitiveness. Thai IC, which is contract-manufacturing based and heavily labor-dependent based on the aforementioned data, the researcher has predicted that people must utilize computers and other electronic gadgets in the present-day other computers and electronic gadgets, including the use of the Internet to assist in work and other aspects of daily life in the current period, are integral to the success of individuals. As the primary driving force behind the organization (Ananda et al., 2016; Babu et al., 2022; Kuechel, 2010), it has proven crucial. However, when utilized, it must deteriorate cause the need for maintenance whether it's a computer, a smartphone, a tablet, or an app, software upgrades are always changing and updating electrical components and this is just as vital as components in other sectors other because if there are no emergency spare components, it will not function in the gadget and the tendency of using technological gadgets has changed in recent years other. There are increasingly other Consistent with global trends, production must be constantly increased. Therefore, the researcher recognizes that the issue of this research is what is the future trend for developing a competitive edge in the manufacturing of electronic components? It is essential to establish a competitive advantage in the manufacturing of electronic components so that the company can effectively compete in other industrial markets that are expanding. The Objectives of the research 1) to study the business conditions of small and medium-sized parts manufacturers 2) to study the composition of small and medium-sized business management strategies of electronic components manufacturers in the Industry 4.0 era 3) To study the service strategy of small and medium-sized businesses of electronic components manufacturers in the age of Industry 4.0

LITERATURE REVIEW

2.1 The 20-year ¬Strategy for Thai Industry Development

Department of Commerce Prepare a 20-year development strategy for Thai Industry 4.0 (2017-2036) to guide the expansion of Thai industry. Thailand must, according to the Industry 4.0 development framework, escape the development trap during the next two decades in order to do so. Both the middle-income trap (Middle Income trap), the inequality trap (Inequality trap), and the imbalance trap must be avoided if the nation's competitiveness and economy are to flourish, and if a 20-year sustainable national strategic framework is to be established. Contains the following 10 strategies: Developing and expanding human capital capacity. Creating fairness and reducing socioeconomic inequality. Increasing economic vitality and competitiveness throughout the long run. Grow green for sustainable development. Develop national security for the expansion of the nation's prosperity and sustainability. In Thai society, government administration, the prevention of corruption and wrongdoing, and good governance are essential. Infrastructure and transport development innovation in science and technology and research urbanization and monetary expansion international development collaboration

According to Bhattacharyya et al. (2007), Industry 4.0 is a complicated policy plan that aims to rebuild the country's industrial structure after it has been demolished by industrialization. It generates basic, low-value things and services for a competitive business by utilizing labor-intensive and fundamental technologies, despite its superior knowledge and technology. Progress and Innovation Somchai brave) Ministry of Commerce (2017) Industrial Revolution 4.0 will develop communication and information-sharing networks to govern the whole manufacturing process, combining the world of production with network connection in the form of the Internet of Things.

2.2 Management theories and concepts

According to Cheng et al. (2022), management or management refers to the operation of two or more individuals collaborating to achieve the goals established by all variables including people, money, and other items regarded as equipment for such manipulation, as well as department organization and resource utilization. Working together to achieve common goals The Hole G theory Eksangsri and Jaiwang (2014) of POCCC stated hypothesis The POCCC has been decommissioned. Henri Fayol (Henri Fayol) created five business management principles. Each one is significant in its own way. They are linked and result in one another at the same time. To finish the work and succeed.

RELATED STUDIES

Edinbarough et al. (2005) published in Nakhon Sawan management strategies affecting the success of transportation operations using a vehicle. Use 156 examples as the sample size. The results were analyzed using the frequency determination t-test, the average standard deviation t-test, and multiple regression analysis with the entry approach to compare the value difference. The findings revealed that 1) the bulk of management strategies included operational and production strategies, followed by research strategy and strategy formulation Management of financial, marketing, and human resource efforts. Successful trucking operations from the perspective of the customer/market, followed by internal operations, learning and growth, and finances; 2) transportation patterns of the sample group affecting the success of trucking operations in the province of Nakhon Sawan (Thailand), excluding the industrial cargo business. 3) The performance of transportation business operations can be predicted by the relationship between business characteristics and management techniques with trucks in the province of Nakhon Sawan (Thailand). A sample group scoring 91.20 will be successful in the operation of high truck transportation.

RESEARCH METHODOLOGY

This study's population consists of entrepreneurs and business leaders in the electronic components manufacturing industry whose operations are located in Bangkok and its environs and provincial locations.

The sample group for this study consists of 336 entrepreneurs and company executives who manufacture electronic components in the Bangkok area and upcountry. The researcher utilized a sample size of 350 individuals, which is a sample selection strategy that does not include probability theory by selecting a sample of referrals

To rank the importance of small and medium-sized business management strategies of electronic components manufacturers in the Industry 4.0 era in the Likert Scale as follows:

A mean score of 1.00-1.49 means that it is least important.
A mean score of 1.50-2.49 means less important.
A mean score of 2.50-3.49 means that it is of medium importance.
A mean score of 3.50-4.49 means very important.
The average score of 4.50-5.00 means that they are the most important.

RESEARCH TOOLS

The researcher has identified the instruments utilized in this study, namely questionnaire separated into three sections:

Section 1 General information about respondents, it resembles a checklist.

Section 2 Information on the organization's overall nature it resembles a checklist.

Section 3 Details on enterprise management strategic factors 4.0. The questionnaire is of the estimate scale variety. There are five tiers according to Likert's technique

Section 4 Open-End. Questionnaire

Independent variable is the technology of saving (resources capital labor) quality, completion time, job satisfaction, planning, organization management, commanding, coordination, and control. Dependent variable is electronic component manufacturers' small- and medium-sized firm management strategies in the era of industry 4.0. Group of business owners and executives producing electronic components in Bangkok, its surrounding provinces, and certain provinces' industrial estates.

RESULT

The following is a summary of the study of small and medium-sized business management methods of electronic component makers in the Industry 4.0 era:

- The majority of respondents were sex workers, aged 36-40 years, with a bachelor's degree in business administration. 11 to 15 years of experience in the company. The company is a distributor of electronic components and a joint venture with foreigners.

- Factors affecting general organizational structure in industry transformation. The majority of them work for the corporation. 51 - 100 Assets are worth between 6 and 8 million baht. 1 - 10% of production costs are borne by raw material imports. 1 - 10% of total product sales are exported. The current performance of the company. It is significantly worse than the 5-year average.

Table 1 Mean and Standard Deviation of Overall 4.0 Enterprise Management Strategy Factors

Factors in corporate management strategy 4.0	**$\bar{x}$**	**S.D.**
Technology	3.51	.800
Economical (resources capital labor)	3.75	.662
Quality	3.62	.825
Finished on time (time)	3.57	.755
Job satisfaction	3.72	.772
Planning	3.60	.707
Organization management	3.37	.799
In the field of command	3.62	.719
Coordination	3.59	.695

Factors in corporate management strategy 4.0	**$\bar{x}$**	**S.D.**
Control side	3.43	.742
Overall	**3.58**	**.638**

The table 1. The results of the analysis of the importance of factors in the organizational management strategy 4.0 revealed that the overall management strategy factor of the organization 4.0. Your research evaluates factors in corporate management strategy 4.0, as indicated by mean ($\bar{x}$) and standard deviation (S.D) values: Technology: Rated at 3.51 ($\bar{x}$) with a moderate dispersion of opinions (S.D = 0.800). Economical: Received a mean score of 3.75, signifying its perceived importance (S.D = 0.662). Quality: Achieved a mean rating of 3.62, coupled with relatively high variability (S.D = 0.825). Finished on Time: Received a mean score of 3.57, with a moderate level of dispersion (S.D = 0.755). Job Satisfaction: Attained a mean rating of 3.72, reflecting its significance (S.D = 0.772). Planning: Scored an average of 3.60, with a moderate degree of variability (S.D = 0.707). Organization Management: Received a mean score of 3.37, coupled with notable variability (S.D = 0.799). In the Field of Command: Achieved a mean rating of 3.62, reflecting its perceived importance (S.D = 0.719). Coordination: Attained a mean score of 3.59, with relatively low variability (S.D = 0.695). Control Side: Scored an average of 3.43, accompanied by moderate variability (S.D = 0.742). Overall, the corporate management strategy 4.0 received an average rating of 3.58, with a standard deviation of 0.638, indicating a moderately dispersed range of opinions. These findings offer insights into the perceived strengths and potential areas of improvement in the management strategy.

Corporate management strategy factors 4.0 is easily summarized as follows:

Aspects influencing the overall management strategy of the organization 4.0 with a high priority level on average. Negative aspects are significant. First comes job satisfaction, then savings (resources, capital, labor), then quality, and finally command. Coordination of planning that is timely and completed with cutting-edge technologies. The relevance of the control component and organizational management was moderate. Furthermore, when studying organizational management strategy elements 4.0, it is feasible to draw the following conclusions regarding the findings of each element: Technology, the introduction of automation or AI to aid in production, was assigned a medium priority, followed by the corporation's push to implement new technology in the operation for each department's employees. In addition, a system is in place to guarantee that equipment and software comply with safety regulations. technology Average, somewhat significant: Wi-Fi is rapid, user-friendly, and widely accessible, while software and hardware development are efficient and quick, reducing production time.

The average degree of importance in the element of saving (resources, capital, labor) is exceptionally high, i.e., the organization has particular tools to detect waste in the production process, followed by the organization with the greatest number of qualified people. Organizations can reduce the prices and expenses associated with importing raw materials for production. Organizations can make more efficient use of resources such as machines, buildings, and personnel. The average savings (resources, capital, and labor) were moderate, showing that the company was able to utilize the production components economically. The firm has a system of systematic and reliable electronic component quality inspection, followed by the ability to produce electronic components that match the criteria. The production standards of the organization have been certified by the auditing and certification agencies for standards. The organization's production method and production standards conform to industry norms. In addition, the company undertakes quality inspections before to, during, and after sales as requested by external quality assurance groups. The value of an organization's ability to plan product output based on capacity and labor length is average. Organizations can give clients with products that meet their needs and are delivered on schedule. Second, the company is able to successfully implement the customer management strategy both before and after the sale, and it has in place production methods that are neither redundant, burdensome, nor time-consuming. The component was completed on time. The organization's typical priority is to acquire inputs in accordance with the production schedule and on time. to satisfy consumer requirements. Job fulfillment A willingness to work according to the system and production process to reduce waste and meet product quality requirements was identified as the most significant desire to learn new skills and work methods, followed by a want to work when the manufacturing process is efficient. Prepared to develop in order to make the work process more effective in accordance with the organization's goals, and eager to work with challenges and participation opportunities. Organization The average level of importance was assigned to clearly defined objectives, goals,

and operational techniques, followed by there is a system in place to alert staff of the work schedule in advance as well as a clear plan and rules for the operational planning portion, indicating that the duration of work was well-defined as well as an operation control plan. The importance of organizational leadership was considered to be medium on average. Following a chart representing the line of work, the company provided training to enhance the employees' skills, knowledge, and job ability. The duties and responsibilities of the position are defined in detail. There is a distinct management or organizational structure. The organization has assigned duties to individuals according to their aptitude, knowledge, and skill. Work groups are segregated based on their status, duties, and responsibilities, and the employees' job characteristics, duties, and responsibilities are established. Control and direction. On average, the supervisors' use of proper authority in assigning assignments and managing positions was deemed crucial. Each department's activity is governed by a delegation of authority that provides the ability to carry out supervisory responsibilities toward subordinates. According to the management structure, the command lines are clearly separated. and commanders can address emerging concerns. The text you provided appears to be a mixture of information from different studies discussing the business climate and management strategies of small and medium-sized electronic component manufacturers in the context of Industry 4.0. The text discusses findings, concepts, and insights related to the strategies and factors affecting these businesses. Here's a summary of the main points:

Study Context: The study focuses on small and medium-sized electronic component manufacturers in the era of Industry 4.0. These businesses typically have 51 to 100 employees and assets of 6 to 8 million baht. A portion of their production expenditures and total product sales is exported. Performance Decline and Adaptation: The current business performance has declined compared to the five-year average. This could be due to the need for businesses to adapt their management strategies to the constantly changing external environment. Management Strategies: Businesses in this context must implement effective management strategies to address challenges. These strategies include creating comprehensive action plans to guide future work, defining job titles, responsibilities, and necessary personnel, establishing organizational structures, and ensuring effective communication and decision-making. Operational Policies and Procedures: Developing operational policies and procedures requires careful analysis and evaluation. The choice of operational approach is influenced by both internal and external environments, referred to as "strategies" that guide firms toward their objectives. Components of Management Strategies: The study identifies five significant components of management strategies for these businesses. Organizational Quality Management: Eight subcomponents of organizational quality management are discussed, including job descriptions, organizational structure, efficient allocation of work, employee development, and customer management plans. Cost-Effective Planning: Cost-effective planning involves setting clear working time periods, defining operational rules, developing efficient software and hardware, and overseeing operations. Foresight and Innovation: Comprehensive action plans serve as guides for future developments and are influenced by foresight and innovative managerial approaches. Human Resource Development: Industry 4.0 shifts affect employee productivity, and developing human resources related to advanced technologies is crucial. Research in this area focuses on integrating digital technologies and improving employee competency. Long-Term Management Planning: Organizations' long-term objectives are achieved through effective management planning. This text provides insights into the challenges and strategies faced by small and medium-sized electronic component manufacturers in the Industry 4.0 era. It emphasizes the importance of effective management approaches, adaptability, and innovation to navigate the evolving business landscape.

CONCLUSION

A study of the business climate of small and medium-sized electronic component manufacturers in the period of Industry 4.0 revealed that entrepreneurs had 51 to 100 employees and assets of 6 to 8 million baht. 1 to 10 percent of overall production expenditures and 1 to 10 percent of total product sales are exported. The present performance of the business It has declined relative to the five-year average. This may be the result of the necessity to adapt management to a continually shifting external environment. Operators must implement management strategies such as drafting a comprehensive action plan or plan of action. It is a guideline for future work, job titles, duties, and responsibilities, as well as the number of people to cover all work processes, as well as the organizational structure to prioritize administration and command, as well as having the necessary command powers to help make quick judgments. Decision-makers must be able to undertake extensive analyses, and coordination at all levels must be effective. Executives to all organizational departments, supervisors to subordinates, and departments to departments. And is responsible for all resources, including raw materials, machinery, manufacturing, and the budget. according to Siriwan Sereerat and his team, so as to function as effectively as

possible (Yang et al., 2022). The creation of operational policies and procedures Various factors require analysis and evaluation. In addition to the initial cause, the choice of how to operate is also influenced by the company's internal and external environments. In addition to being referred to as "strategies," these are the activities, plans, or initiatives that are carried out in accordance with each strategy as a guide for the firm to achieve its vision and objectives. A study on the composition of small and medium-sized business management strategies of electronic component manufacturers in the era of Industry 4.0 identified five significant components. The researcher then discussed the findings in each section as follows: The eight subcomponents of organizational quality management are: (1) job description and responsibilities; (2) organizational structure; (3) allocating work according to position and responsibility; (4) arranging employees to perform their duties according to their knowledge and competence; (5) employees are satisfied with challenging work; (6) employees are prepared for development to increase work efficiency; and (7) the customer management plan is implemented on time. (8) Quality assurance of external standards organization This may be due to the fact that company administration requires the determination of employment titles, positions, and responsibilities. as well as the amount of personnel necessary to cover all job operations, as well as the organizational structure to prioritize administration and leadership. If the organization has an organized management structure. The work is clearly separated and does not overlap, the responsibilities are exhaustive, and the staffing level is sufficient. It will surely boost the work's efficiency. and a high possibility of achievement. The findings of Chirumalla et al. are supported by research on "Developing Technological University into Industry 4.0." (2018). This study discusses the reasons of Industry 4.0 as well as management recommendations for Technological University to promote their entry into Industry 4.0 via surveying and data collecting. The University of Technology should design a sector-spanning strategy. It should emphasize student and industry development. And should allocate valuable resources to boosting competitiveness. to expand and alter the position of all technological universities on the market. Moreover, according to Dai et al. (2014), quality management throughout the organization is essential for establishing organizational management excellence. As a result of quality management, an organization-wide effective work system exists. have standard, verifiable work and satisfy customer requirements. Cost-effective planning consists of four components: (1) establishing the working time period explicitly; (2) providing clear operating rules (3) developing highly productive software and hardware (4) Oversee operation planning. (5) A system is in place to notify employees in advance of their work schedule. This may be the result of designing a comprehensive action plan or course of action to cover all procedures. It serves as a guide for future developments. This planning is guided by foresight and innovative managerial foresight. This will be delivered as an action plan containing objective that must be accomplished for success. Eksangsri and Jaiwang (2014) did research titled "Developing Human Resources Competency 4.0 to Optimize Thailand 4.0 Operations." Examining demographic characteristics is the focus of this paper. human resource development. Additionally, switching to Industry 4.0 affects employee productivity. The research discovered that developing people who are related to advanced technologies by surveying and obtaining data from questionnaires and interviews. Internet access using office applications and digital technologies integration of industrial machinery and robotics Industry that is environmentally friendly Furthermore, the future application of complex and advanced technologies pertinent to the industry may explain employee performance. According to Estill et al. (2020), an organization's long-term objective is management planning.

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