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RICE Journal of Creative Entrepreneurship and Management (RJCM)
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About Us

RJCM is an international journal for academics and scholars at the higher education level to communicate and share their viewpoints and academic work with fellow professionals in the areas of creative entrepreneurship and management as practiced in their fields of specializations in social sciences. Currently, it is classified as Tier 2 in Thai-Journal Citation Index (TCI).

RJCM publishes three numbers per volume annually and welcomes contributors to submit their manuscript in January, May, and September of each year. We accept both academic and research papers in social sciences from contributors. The papers are double-blind three-peer-reviewed in each volume and published online-plus-print thrice a year.

The length of the unformatted manuscript in WORD can be 15-25 pages in length including references. The contents of the manuscript should include (1) a title with the author's name, affiliate, email address and telephone contact, (2) an abstract of 150 words with 3-5 keywords, (3) an introduction, (4) a rationale and background of the study, (5) research objectives, (6) research methodology, (7) data collection procedure, (8) data analysis, (9) results and discussion, (10) research limitation (if any), (11) conclusion, (12) acknowledgement(s) (if any), (13) the author's biography of about 50-80 words, 14) references, and (15) an appendix or appendices (if any).

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Note from the Editors of *RJCM* Volume 4 Number 1

Dear *RJCM* Readers,

You are now with our first issue in Year 4 of *RICE Journal of Creative Entrepreneurship and Management* (*RJCM*). This issue contains six articles in the areas of management models, business design development, entertainment business and art teachers' professional competencies.

In this issue, we have three papers on management models: *"Management Model for Green Corporate Image"* (Article 1), *"Digital Leadership Development Model for Science School Administrators in Thailand"* (Article 2), *and "Management Model for Environmentally Friendly Business Operations of Industrial Factories in Nakhon Ratchasima Province"* (Article 6). There is one paper on business design development: *"Design Development of Environment and Facilities for Disabled Workers in Department Stores and Large Wholesale-Retail Businesses: A Case Study of Mahatai Foundation"* (Article 3), and another reporting entertainment business in China: *"The Analysis of Cinemas in China after the End of COVID-19"* (Article 4). The fifth paper examines art teachers' professional competencies in China: *"The Professional Competencies of Art Teachers to Teach Non-art Students in Colleges and Universities in Guangxi Province"* (Article 5). As for *Sharing Professional Viewpoint*, the author shared his concern over Thai students' and teachers' performances on the national tests: *"Support for Thai Teachers of Language, Mathematics and Science."* These articles report interesting findings and current issues in the areas under study.

Our paper contributors in the first issue of 2023 are researchers from five higher education institutions in the central provinces of Thailand: (1) AssumptionUniversity, (2) Bangkokthonburi University, (3) Southeast Asia University, (4) Rajamangala University of Technology Rattanakosin, and (5) Educational Innovation Institute of Promote Alternative Education Association.

The editors-in-chief hope that the research findings and current developments reported in these papers will be interesting to both researchers and practitioners in similar fields of study. The *RJCM* editorial team and the authors would appreciate our readers' comments about these articles, if possible. We always welcome contributions from those who may wish to be part of our *RJCM* network.

Nuttapong Jotikasthira, Ph.D., Editor-in-Chief 1
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Address from RICE Director

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Dear *RJCM* Readers,

We are now in the post period of the Covid-19 pandemic that has impacted the ways we lead our academic lives in teaching, learning and doing research. Scholars need to adjust themselves in communicating with their peers, colleagues, counterparts and students under their teaching responsibilities. Some have turned to a hybrid mode in working by combining an electronic platform of their choice with human contacts as seen fit in their context. Such adjustments have led to studies on new models of teaching-learning as well as innovative means to share ideas and conference agendas via electronic means currently available for communication. We have also witnessed the greater role of AI in the paths of work and life worldwide. The direction we are heading to with AI as our smart assistant has raised more and more public agitation with the ethical use of human-like devices. This is a matter of individual as well as global concerns over the futuristic applications of the information technology humans have claimed to master for the great good of mankind.

As new innovative developments evolving out of the huge circle of technology applications, scholars and researchers have selected their channels of communication, conscientiously work toward their academic goals on adding new knowledge and research findings to the existing body of knowledge in their areas of specialization. In this regard, the articles contributed to *RICE Journal of Creative Entrepreneurship and Management* after the post-pandemic time are always of great value to the academic communities at both the local and international levels.

I feel much obliged to all the authors for contributing the betterment of their work to academic communities. Your research in different fields of management and creative entrepreneurship certainly helps reexamine all current issues under study for sharing and bridging our academic interest in the years to come.

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Management Model for Green Corporate Image

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Abstract

The purpose of this research was to investigate the level of *green* supply chain management, its innovative orientation, product design practice, the involvement of employees and a *green* corporate image. The researchers studied (1) the product design practice and employee involvement as intermediary variables linking *green* supply chain management, (2) the focus on innovations toward the *green* corporate image, and (3) the ability of interstitial variables as transmission variables in the context of *green* supply chain management. The samples were 400 small and medium-sized entrepreneurs who operate their business with an emphasis on the environment; they were corporate executives focusing on environmental management and set into two sample groups of 200 each. The study used a two-stage sampling method and simple sampling to re-examine the causal model using AMOS program. The study results found all studied factors with a high mean level. The analyzed model of the small and medium-sized entrepreneurs who operate their business with an emphasis on environmental management on the Harmonious Index at $x^2/df = 2.921$, RMSEA = 0.074 and RMR = 0.035 which influenced the curve of all factors affecting the management model for green corporate image. This is a distinctive feature of small and medium-sized entrepreneurs under study with an emphasis on environmental management.

***Keywords*:** *Management model, green supply chain management, innovative orientation, product design practice, employee involvement, green corporate image*

1. Rationale of the Study

The global trade situation is changing rapidly. The direction of the world economy has been transformed into a new economy by relying on the strength of Information Technology with speed and the ability to access information on a variety of communication formats. Therefore, entrepreneurs can take advantage by creating competitive potential with risks and opportunities. Long-term economic growth by minimizing negative social and environmental impacts includes the utilization and management of natural resources. Therefore, business operators need to adapt and develop themselves to survive and grow stably and sustainably. In such a scenario, organizational development toward sustainability must be integrated and driven concretely. An organization, sustainable development requires utilization of the global ecological potential (Edward, 2017) in technology, knowledge, creative design development—all leading to innovations that will affect the performance of the organization along with the integration of resource management and organizational capabilities derived from experience and knowledge of skilled entrepreneurs.

They are to create a structure that is permanently superior to competitors and differ in form, value, superior benefits, and profits above the norm to the organization (Barney, 2002). The Sustainable Economic Welfare Index is an adjustment of gross domestic product (GDP) reflecting the welfare or quality of people's life in society, and arising from economic development to protect the environment from the problems of economic unsustainability, particularly as caused by the management's inability to apply new knowledge against pollution before production to reach consumer group for maximum satisfaction. The sustainability activities must relate and connect with added value for products and services, as well as innovation-oriented development that includes practical training in the process of product design development. These activities are to create regular interactions from employees' participation (employee involvement) planned by the management and employees working as a team. The participation of employees contributes to learning and building mutual understanding (William, Smol & Birks, 2002) and can create employee engagement both at the employee and organization levels. Employees can feel they are part of the organization with a good corporate image, take pride in their work, stick to corporate ideals toward a common goal upon a long-term positive relationship with the organization and loyalty to the organization (Kotler and Keller, 2006).

In the context of business sustainability, the focus rests upon three goals: Human Resources, Planet and Pollution. These three parts form green organizations. It is the management of the supply chain management system in the field of green production from purchasing onto the design of green products with elements of both raw materials and green packaging. Green Packaging seeks maximum profits as sustainable profits. Doing business for the benefit of customers and society is considered a green product development approach. This approach requires an understanding of the product to supply quality materials and production processes that are effective in reducing waste, and having proper and appropriate disposal methods. The use of resources needs cost effectiveness and environmental friendliness for maximum benefits. Green products are for Green Corporate Image as an important factor demanded by stakeholders in promoting business growth. Sustainable development pays attention to the greenhouse effect on the ecosystem and biodiversity. Today, consumers are increasingly aware of the environment conservation in various aspects of daily use of products and services. Packaging is one obvious example that causes global warming. Its effects lead consumers and manufacturers around the world to use more environmentally friendly packaging materials that can decompose naturally in the disposal process. As seen, Thailand is no exception among various countries in following the trend in environmentally friendly packaging.

From the green production trend aforementioned, the researchers of the present study explored a possible management model for a green corporate image by bringing in current green knowledge and technology for environmentally friendly corporate management in creating a good green image by international standards.

2. Research Objectives

There were three research objectives:

(1) To investigate the level of green supply chain management, innovative orientation, product design practice, employee involvement and green corporate image.

(2) To study the product design practice and employee involvement as an intermediary variable linking green supply chain management and the innovative orientation toward a green corporate image.

(3) To study the ability of interstitial variables as transmission variables in the context of green supply chain management.

3. Research Hypotheses

The researchers formed two hypotheses for the study:

(1) Management of a green corporate image for supply chain management affects product design practice, innovative orientation, employee involvement and green corporate image.

(2) Management of a green corporate image with a focus on innovation influences product design practice, employee participation and green corporate image.

4. Scope of Research

Content: a management model for a green corporate image in green supply chain management comprises product design practice, innovative orientation, employee involvement and green corporate image.

Participants: 400 small and medium-sized entrepreneurs who operate businesses with an emphasis on the environment, and as corporate executives have used environmental management according to the international environmental system standards.

Area and data time: Thailand in April 2020.

5. Research Terminology under Study

Green Packaging refers to the packaging or container used to transport products from the manufacturer to the intended consumer. Natural materials are for the purpose of conserving the environment, reducing the amount of waste, and degrading naturally. They are harmless to the environment and save cost. Packaging can be reused. Selection of natural materials favors abundance and availability in the local area.

Natural materials refer to materials available naturally and harmless to the local environment. They are degraded naturally in the local ecosystem according to the positive relationship among the local organisms.

Green Packaging Product Design refers to the packaging design that supports natural material containers used for transporting products from manufacturers to the consumer destination. The design favors local natural materials that are environmentally friendly.

Green Supply Chain Management (GSC) refers to the process of planning and managing before the production of the product and distribution of the products to consumers for maximum satisfaction via suitable channels in the flow of raw materials, procurement, production, storage, applied technology, freight distribution--all processes linked together by the international standards in creating added value for products and services to consumers' satisfaction.

Innovative Orientation (INO) means promoting innovations toward change by creativity for invention. This could be a new technology, idea, process, or a product being creatively

modified and strengthened in new features--enabling businesses to create a sustainable competitive advantage.

Product Design Practice (PDP) refers to the design process and product development. There is a process of collecting data for analysis and applying the concept of problem-solving process in the design process and product development.

Employee Involvement (EMI) refers to the creation of activities in the organization to enable personnel in the organization to participate in the target activities. The purpose is to support personnel to feel they are part of the organization and can help solve problems at work so that they take pride in their work as contribution to success of the organization at large. They are expected to build a positive long-term relationship with the organization, adhere to its ideology and common goal to instill in themselves loyalty to the organization.

Green Corporate Image (GCI) refers to the overall image of an organization that an individual perceives through experience or knowledge or impression toward an organization as having a role of social responsibility regarding environmental conservation in its management of products and services.

6. Related Literature

Green Supply Chain Management (GSC) refers to the process of consolidating planning and management before the production of products and onto consumers for maximum satisfaction via various channels in the flow of raw materials, procurement, production, storage and applied technology, freight, distribution according to the international standards to create added value for products and services for consumers' satisfaction.

Green supply chain management influences a green corporate image. The process of environmental management combined with green supply chain management are to reduce the environmental impact of the supply chain process for efficiency in cost reduction and competitive advantage in terms of reputation and image (Ngyun & Lelanc, 2001; Vachon & Klassen, 2007). It is recognized as the most effective variable in stimulating operations and building a good image of the organization. The green image serves as an invaluable asset that can impress consumers to have positive attitudes toward the organization's practices, products, goods, and services. The feeling of quality is communicated between individuals and customers of the organization concerned. The green management and its green image are invaluable to an organization in reducing production costs while conserving the environment for a good corporate image.

Sustainability derived from innovative orientation involves a change in corporate philosophy and value that guide specific objectives to create and realize sustainable social values and economic returns (Doherty et al., 2015). Business model innovation arises from transforming processes, products and organizations in order to more successfully integrate sustainability into their core businesses (Schiederig, Tietze & Herstatt, 2012) as well as new business models or replace products with alternatives in solving technological problems regarding how to use, organize activities, and increase performance within the scope of the organization. There is a goal for change in mobility, response to requirements and the pursuit of increased efficiency in creative approaches to sustainability (Alston and Roberts, 1999). Existing innovation capability is the beginning of corporate culture promotion. It has clearly defined goals at the product level (Petala et al., 2010) and organizational

involvement in motivating employees to perform successful tasks. The concept of innovation paradigm is an important role of business in today's society of corporate development for sustainability. In turn, strategic sustainability in product innovation will reflect the obstacles of the organization and corporate culture (Petala et al., 2010).

As for product design practice (PDP), there is a process of collecting data for analysis and apply the concept of problem-solving process in the design process for product development. Product design management aims to improve the coordination of design activities for design practicality. The organization needs to verify the practice and organizational processes in support of creative and knowledge-based product design. The importance of leveraging a wide range of knowledge in effective product design and in brainstorming to create creativity during the product development process will lead to a new body of knowledge in the practice by *design thinking* (Kalogerakis, Luthje & Herstatt, 2010). This can be seen as a problem-solving activity, reasoning, understanding things, and giving meaning for the product. Design thinking is regarded as an innovation with a belief that anyone can be a designer by learning why (Dunne & Martin, 2006). Product design management requires innovative ideas for production. It is possible to evaluate the thought process empirically in order to develop it into a new idea in the future decision-making process. Problem-solving can be done by visualizing the value of the solution. Novelty initiative indicates the taste and uniqueness of the organization's solution and its flexibility to improve and change products to meet the needs of customers. The design department as a coordinator for design management operations will allow the organization to make improvements in product development to meet the needs of customers as part of sustainable growth.

Employee involvement (EMI) allows personnel in the organization to participate in the activities to feel they are part of the organization. They can help with problem-solving tasks for the organization’s common goal on personnel loyalty. Personnel participation in the process of development, co-thinking, co-decision making, problem solving and allocating resources is to achieve goals on organizational planning (Williamson, 2008). According to Cohen & Uphoff (1977), there are four dimensions of decision-making: (1) what to do and how to do it; (2) the effort in developing and implementing the decision; (3) sharing of operating benefits; (4) project evaluation of participatory management as the process of involving subordinates in the decision-making process. The active involvement of individuals using their creativity and expertise in handling important administrative problems is based on the division of power in the process of participatory management. It is associated with the concept of belief in the assumption about human nature on appropriation and participation in work without compulsion. The concept of organization encompasses a place for life and thinking development, leadership style, management of the business context engaging employees to improve efficiency within the job for the benefit of the organization. This requires a two-way relationship between the employer and employees (Mone & London, 2011). It is an employee's sense of focus on personal initiative to work toward the expected goals of the organization. The personnel’s deep relationship with the organization will create willingness to go above and beyond what is expected for success for their organization (Johnson & Johnson, 2011).

Green corporate image (GCI) presents the overall image of an organization perceived by the public. Consumers have knowledge or impression as well as feelings toward an agency or institution by looking at the role or organizational behavior in the economy and the society as a whole in terms of environmental conservation through the management of products and services. Environmentally friendly organization management aims to achieve a green corporate image. Beliefs and impressions about the organization's environmental activities are for customers to have positive attitudes toward the products or service (Zameer et al., 2020). Commitment to preserving the environment for the future and sustainability through social responsibility practices are embedded in a business model that assesses the impact of actions on social considerations for environmental friendliness as the vision of the organization. Environmentally friendly action leads to the value of environmentally friendly products. Positive perception and trust from consumers will result in functional and emotional benefits (Lin et al., 2017). Creating a sustainable corporate image on products and services based on employees' participation in activities will increase the organization's competitiveness and market share (Bathmanathan & Hironaka, 2016). As consumers are increasingly concerned about ecological issues, organizations are encouraged to support employees to participate in environmental protection activities (Saran & Shokouhyar, 2021). The benefits of an environmentally friendly brand influence consumer loyalty toward a product or service as their primary concern when making a decision on their purchase. Especially in an industry where there are high negative external factors, a good green image will benefit in greater financial performance (Aivazidou et al., 2018). In this regard, organizations should build a green image to attract potential customers both in the short and long run.

7. Research Methodology

The researchers used quantitative research in the Causal Model Exam using data obtained from the questionnaire and the structural equation performed on latent factors in green supply chain management and innovative orientation. The interstitial factor consists of the product design practice factor, and employee involvement. Another factor is the image of green organization.

7.1. Research Data

Research data consisted of theory and research from primary data sources. The researchers collected information from related research papers, looked at relevant theories and academic work obtained from preceding documents, books, articles and other media sources. The obtained documents were on Thailand and international contexts for good understanding of concepts, theories and principles of Management Model for Green Corporate Image. As for the main data, the researchers used a constructed questionnaire (validated by three green management experts) to collect data from two sample groups under study.

7.2 Population and Sampling

The two populations used in this quantitative research study were small and medium-sized entrepreneurs as corporate executives focusing on environmental management by the

environmental standards and the management system standards (ISO 1400, NTC). The sample size determination was based on the model and therefore relied on minimum values guaranteed to test structural equations. Using the principle of Cohen (1988) and Westland (2010) as the determination of power of test = 0.80, significance level 0.05, the researchers identified 5 latent variables and 21 empirical variables. The results were calculated with n sample size steps. Low was at 150 samples. This research used a total sample size of 400 respondents--200 from each population, to be tested by structural equations according to the principle of Cohen (1988) and Westland (2010).

7.3 Population Scheme

The researchers used two-step sampling in two steps: Step 1: Randomized small and medium-sized entrepreneurs who operate businesses with an emphasis on the environment. Step 2: Entrepreneurs in four regions were in the north, central, northeastern, and southern region, and 50 samples were secured per region, totaling 200 samples. These executive samples worked by the management system standards (ISO 1400, NTC), environmental standards for corporate executives, and TIS standards for executives. There were four groups of executives, 50 samples per group, a total of 200 samples per small/ medium-sized entrepreneurs—making a grand total of 400 samples.

8. Research Results

This section reports results on (1) the level management model for green corporate image of the sample group for each factor, and (2) hypothesis testing from the research conceptual framework.

8.1 The Level Management Model for Green Corporate Image of the Sample Group for Each Factor

Table 1 reveals the management of the Green Supply Chain Management (GSC) and the Innovative Orientation (INO) sectors as similar in data distribution and direction. As for the intermediary factor, it was found that Product Design Practice (PDP) and Employee Involvement (EMI) also showed similar outcomes.

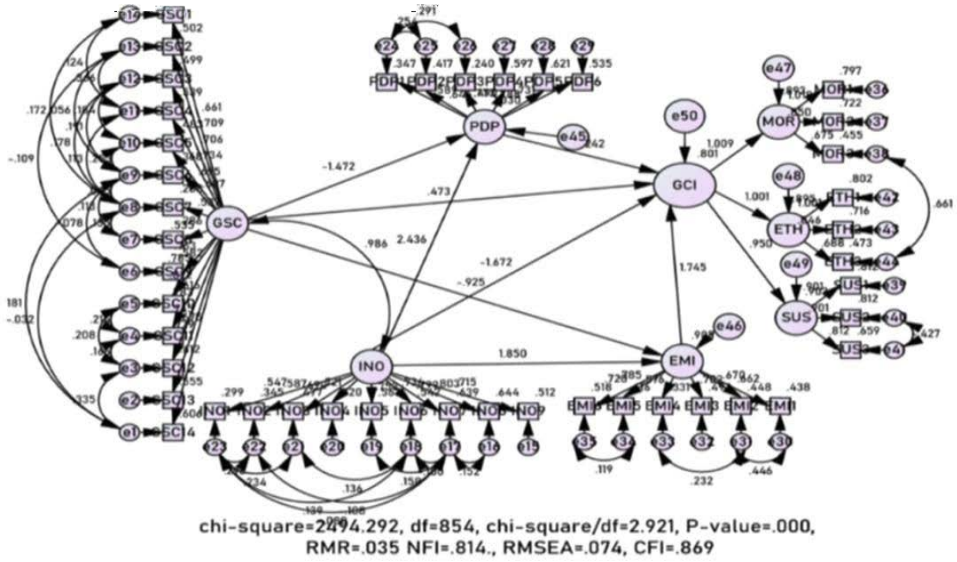
Table 1: The Management Level Statistics for Green Corporate Image in Various Factors

Factor	Mean	Standard Deviation	Coefficient of Variation	Meaning
Green Supply Chain Management (GSC)	4.51	0.36	0.14	very high
Innovative Orientation (INO)	4.44	0.65	0.15	high
Product Design Practice (PDP)	4.51	0.34	0.14	very high
Employee Involvement (EMI)	4.54	0.36	0.16	very high
Green Corporate Image (GCI)	4.44	0.51	0.11	high

8.2 Hypothesis Test from the Research Conceptual Framework

Figure 1 displays five clusters of variables of each factor as shown earlier in Table 1, and their interrelationship via covariance-based structural equation analysis.

Figure 1: The Results of Covariance Based Structural Equation Analysis



As seen in Table 2, the test results on the negative influence of Green Supply Chain Management (GSC) factors were consistent with the heavy workloads in Green Supply Chain Management, and negatively affected Levels of Product Design Practice (PDP) and Employee Involvement (EMI), while Innovative Orientation Management Factors (INO) promoted both Product Design Practice (PDP) and Employee Involvement (EMI). Green Supply Chain Management (GSC) and Innovation Oriented (INO) issues did not directly affect the Green Corporate Image (GCI). Green Supply Chain Management (GSC), which encompassed Innovative Orientation Management (INO), and Employee Involvement (EMI) needed transmission through interstitial factors to represent the image of a Green Corporate Image (GCI).

Table 2: The Coefficients Standard Deviation and t-Statistic in Hypothesis Testing

Hypothesis	Standard coefficient	S.E.	t-test	P-value	Conclusion
GSC-> PDP	-1.472*	0.393	-2.050	0.040	negative influence
GSC -> EMI	-0.925*	0.275	-2.093	0.036	negative influence
GSC -> GCI	6.446	6.965	6.648	6.428	non influence
INO-> PDP	2.463***	0.463	6.666	6.666	positive influence
INO -> EMI	1.850***	6.325	4.653	6.666	positive influence
INO -> GCI	-1.672	1.867	-0.705	0.481	non influence
PDP-> GCI	0.242	1.568	0.194	0.846	non influence
EMI -> GCI	1.745**	0.611	3.160	0.002	positive influence

*p=.05, ** p=0.01, ***p=0.001

Table 3 reports the results of the influence of both Exogenous Factor and Endogenous Factor causal factors in that the Innovative Orientation Management factor (INO) had a total high influence on Green Corporate Image (GCI) at 2.144, where Green Supply Chain Management (GSC) gave the opposite negative result at the -1.494 level, consistent with the explanation given in the hypothesis testing results. The interstitial factor between INO and GSC most accounted for the transmission of such influence. The

Employee Involvement factor (EMI) was 1.445, equivalent to 4.2 times the Product Design Practice Factor (PDP) in acting as an interstitial variable as well.

Table 3: Direct Influence, Indirect and Collective Sample
(Calculated from Standard Coefficient)

Factors	Influence	GSC	INO	PDP	EMI
PDP	DE	-1.472	2.436	NA	NA
	IE	NA	NA	NA	NA
	TE	-1.472	2.436	NA	NA
EMI	DE	-0.925	1.850	NA	NA
	IE	NA	NA	NA	NA
	TE	-0.925	1.850	NA	NA
GCI	DE	0.473	-1.672	0.242	1.745
	IE	-1.970	3.819	NA	NA
	TE	-1.497	2.147	0.242	1.745

Model Harmony Index Based on SEM Covariance based analysis

Tests for the harmony of each model of empirical data were as follows:

x^2/df = 2.921, RMSEA = 0.074, NFI = 0.814, CFI = 0.869, IFI = 0.870, RFI = 0.795, RMR = 0.035, which pass the judging criteria; unless the RFI value is at the Acceptable level (>0.75), it can be concluded that it can be accepted. That is appropriate for passing the judging criteria; unless the RFI value is at the Acceptable level (>6.45), it can be concluded that it can be accepted and appropriate.

9. Discussion of Results

The study evaluated five factors in the research conceptual framework, and it appeared that the sample of the GSC factor had the highest mean of the coefficient of variation (0.14). It was classified as a business-level strategy with emphasis on green products offering differences or green services that are different from those from competitors. Differentiation serves as a guideline or strategy for market expansion to expand market share (Market Penetration), strategy for market development (Market Development), strategy for product development, and strategies to expand to other businesses (Diversification) through the selection process for appropriate business strategies. As seen from the results, the supply chain as a structure to manage business, marketing and production in an efficient operational process covering upstream raw materials to the sale of environmentally sustainable downstream products (Christopher, 2016). On the INO factor, the highest average coefficient of variation (0.15) is a function-level strategy. Since this research focused on the production department for innovative commercial products that were environmentally friendly, the INO factor supported the earlier study by Alston and Roberts (1999) that described innovation as a response to requirements for creative-to-practice approaches in the design of sustainable production processes. The PDP factor had the highest mean coefficient of variation (0.14), indicating that the implemented strategy coined as Strategic Deployment in the questionnaire focused on production; this point corresponded with the research finding by Paige (2021) in that product development and rigorously executed sales, analysis, iteration and care for the product—all being appropriate for the lives of consumers. Communities and environmental

systems by human-centered design need to be coupled with material selection and sustainable production.

As for the EMI factor, the mean coefficient of variation (0.13) was the highest level of employee participation. Emphasis was on teamwork where employees can make decisions on reducing the waste of resources. The EMI result supported the research of Watson (2010) in that participative decision- making accounted for successful organizational management. For PDP and EMI, their role was to promote GSC through the push of INO. Moral and ethical aspects--determined by average and coefficient of variation—as seen in the high average scores for all sub-items. This pointed to the importance of doing business in the environmental dimension to create a good conscience for society and the environment as a whole. Ethical values in business fundamentally related to nature enable business entrepreneurs to deal with environmental problems particularly in reducing energy consumption and using clean energy as a key element in sustainable business operations for environmental conservation. This point signifies how new technologies can help increase efficiency and flexibility of production processes and distribution channels to meet the needs of consumers (Chen, 2006).

9.1 Research Benefits

The researchers would like to present the benefits of this research in two folds:

(1) As for the management, the image of a green organization via Green Supply Chain Management should serve as a business strategy that covers multiple functions, such as purchasing, production, human resources and marketing activities. Hence, organizations should beware the opportunities and risks from supply chain management in the global market. This is a move from the traditional system to a modern management system with concrete behavioral patterns. Obviously, customers' role comes into play with their demand for innovations and new technologies in exchange of knowledge and news via social media. This will lead to one of the main factors affecting business operations, namely cost reduction for added value. Innovation and marketing promotion the organization has adopted will be intertwined with sustainable development practices with integrity under good corporate governance under a sustainable supply chain management. The concept of Green Supply Chain is undoubtedly related to reducing environmental impacts to show corporate social responsibility and create a reputation for the organization. This is to create a good image to attract customers and win over their loyalty.

(2) Businesses need to adapt themselves to survive and grow steadily in the context of sustainable development of the organization. It is important for a business to integrate itself into sustainable development for the quality of human life on the ground of the global ecological potential and business growth based on technology, knowledge, and creative design. The key innovation factors would certainly affect an organization's performance and its green corporate image. In all, the principles of management for the green image need to appeal to consumers' acceptance by the international standards in support of sustainable business operations now and beyond.

9.2 Future Research

As reported in this paper, the Management Model for Green Corporate Image is a strategic management principle as an organization's mission. The management for a green

corporate image has a concern over the deteriorating environment of the world tremendously affecting life on earth. It is necessary to balance the economy, society and the environment. Environmentally friendly innovations in the use of resources for production show themselves as the current trend in sustainable management.

The researchers felt that there should be further research into green production in different industries. The government's role on encouragement and support for entrepreneurs to operate on green supply chain management should be stated as a long-term policy, and such issues need research into the government's planning, production process, implementation and evaluation.

Research into business innovations in the leading industries should deserve more attention from research agents and government authorities. Cultivating awareness in protecting the environment can help improve green supply chain management (GSC) as a working management model. It should be noted that policy implications of an organization need to cover all departments for success in the target corporate-level strategies in the environmentally friendly context.

10. The Authors

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Digital Leadership Development Model for Science School Administrators in Thailand

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Abstract

The objectives of this research were to (1) examine the current and desirable conditions of digital leadership development of science school administrators in Thailand, and (2) propose a digital leadership development model for science school administrators in Thailand. The population in this research was personnel of 18 science schools in Thailand, in two groups--the administrators and the teachers. The first group--18 executive directors and 18 deputy directors--was purposively selected, and the second group--246 teachers as school human resources—was selected by a multi-stage random sampling. The two instruments used in the study were a self-rating questionnaire and a semi-structured interview guide, covering the current and desirable conditions of digital leadership in science school operations, and suitability and feasibility assessment of the proposed model. The obtained data were analyzed by mean, standard deviation, Priority Need Index (PNI Modified Index), followed by content analysis. The results showed that the whole current condition of digital leadership development was perceived by the respondents at a high level ($\bar{x}$=3.61, SD=0.60), and the overall desirable condition was rated at a very high level ($\bar{x}$ 4.66, SD=0.52). The digital leadership development model carried four components, namely, (1) *The main components* consisted of five dimensions: (i) visionary leadership, (ii) communication strategy, (iii) management system integration, (iv) educational innovation organization, and (v) culture of digital learning. (2) *The development methods* held five dimensions: (i) digital self-learning, (ii) online self-learning, (iii) online training, (iv) online study and certificate, (v) AI-learning via human resource management system. (3) *The development goals* contained five dimensions: (i) motivation, (ii) building confidence, (iii) allocation of access time, (iv) leading to change, and (v) virtualization. (4) *The characteristics* comprised seven dimensions: (i) diversity

awareness, (ii) influencing ability, (iii) good governance, (iv) information management, (v) clear targeting, (vi) aim for achievement, and (vii) learning agility respectively.

Keywords: *Leadership development model, digital leadership, science school administrators, science school management, Thai science school teachers*

1. Introduction

The Ministry of Education stipulated educational reforms in the second decade of 2009-2018 with the vision that "Thai people access to quality lifelong learning." Four areas of reforms were systematically delineated, namely, (1) improving quality of education and learning, (2) increasing opportunities and options for education, (3) providing opportunities for Thai people to access quality learning, and (4) encouraging participation from all sectors of society in educational management. To comply with the National Education Act B.E. 2562/ 2019, the Office of Basic Education Commission has emphasized quality improvement as a prime driver of curriculum implementation, teaching and learning management, including learners' measurement and evaluation (Ministry of Education, 2019). Thailand has recognized the importance of education and aimed to bring in the ICT system to support education management and maximize students' learning inputs/outputs. It has been conceived that ICT can exert great impacts on the education system, which mainly involves gathering data information, and knowledge, organizing and processing data, transmitting and communicating data and information at a high speed and in large volume (Phakamach et al., 2021a). ICT also facilitates presentation and display of data and information, with various media systems, such as, images, audio, animation and video, which can create an interactive system that will make learning in the new era successful (Sinlarat, 2020). With the ever-increasing volume of a vast body of world-class knowledge, learning in the new era includes both volume and speed, with which learners need to be able to distinguish, search and seek out for those relevant to their needs (Håkansson Lindqvist & Pettersson, 2019; Caredda, 2021).

In addition, to comply with the government's policy according to the Twenty Years National Strategy (2017-2036), the 3rd ICT Master Plan, and the National Education Act B.E. 2562/2019--all envisioning more application of computers and the Internet in education provision, the Ministry of Education has therefore endorsed its policies and standards to encourage educational institutions and educational agencies to utilize ICT in education, by enabling teachers, educational personnel, and learners with capabilities to access educational platforms in teaching and learning via management systems. Consequently, basic education institutions need to explore and adopt ICT management systems to develop educational innovations and further improve the quality of education (Wachirawongpaisan et al., 2021a).

"Science School" in Thailand is a boarding secondary school that provides education for students with exceptional abilities in mathematics and sciences at both lower and upper secondary levels. The fundamental missions are to study, research, develop and cooperate with various government and private agencies, both at the domestic and international levels, in order to offer a unique curriculum with excellence in mathematics and sciences for students competitively screened at both levels. The science school category is expected to educate and nurture the young talents over six years in the curriculum with not only basic knowledge of

secondary education, but also incubate the spirits of researchers and innovators in science and technology, sound minds and bodies, proper morality and ethics, strive for learning, patriotism, public-mindedness, and global awareness. It is well conceived that conventional management systems currently organized for general secondary schools in Thailand could not fully support the new science school management (Phakamach et al., 2021c). Based on the special and innovative missions assigned to all science schools, the teaching and learning management system has to accommodate innovation, technological inclusion, suitable buildings, and school leadership for change relevant to the global trend of the 21st century (Phakamach et al., 2021c).

Under the disruptive digital transformation process, an organization needs to build its own digital resilience particularly with effective human resource development so as to adapt its operations toward the intended goals (Vial, 2019; Kashive et al., 2022). For educational organizations, the IT-function building is practically shouldered by the leaders or administrators to handle such complex and challenging tasks (Håkansson Lindqvist & Pettersson, 2019). Digital leadership competency is, therefore, essential for administrators in the era of disruptive transformation (Phakamach et al., 2021b). To fulfill the demanding mission of "Science School" in Thailand, human resource empowerment at both executive and teaching force levels serve as the key strategy. It is also envisioned that in order to support and maintain smooth operations, a so-called continuous human resource development has to be effectively practiced (Wachirawongpaisan et al., 2021b).

Considering such a rationale, the research team was interested in examining and proposing a digital leadership development model for science school administrators in Thailand in providing support for leadership development of science school administrators and enhancing the effectiveness of science school operations in Thailand as a whole.

2. Research Objectives

The study had two research objectives:

(1) To examine the current and desirable conditions of digital leadership development of science school administrators in Thailand, and

(2) To propose a digital leadership development model for science school administrators in Thailand.

3. Research Methodology

This research carried three aspects as follows:

3.1 Population and Samples

The population was personnel of science schools and regular secondary schools offering the science and mathematics-oriented curriculum in Thailand. The participants were from: (1) A total of 16 schools under the Office of the Basic Education Commission, namely, 12 Chulabhorn Ratchawitthayalai Schools and four general secondary schools, Bodindecha School, Yupparaj Wittayalai School, Samsen Wittayalai School, and Hat Yai Wittayalai School; (2) 2 special schools under the supervision of the Ministry of Education, Mahidol Wittayanusorn School and Kamnoet Wittaya School respectively. A total of 282 samples were drawn from personnel of these 18 schools. The first group of 36 persons were purposively selected from the directors and deputy directors, while the second group were 246 teachers selected by a multi-stage random sampling.

3.2 Research Instruments

There were two main instruments in this study:

(1) The instrument used in the quantitative research part was an integrated self-rating and open-ended questionnaire containing items designed to solicit perception and suggestions concerning the development of digital leadership model for science school administrators in Thailand. The questionnaire contained three parts: (i) general information of the respondents, (ii) perception of the conditions and development patterns of digital leadership of science school administrators in Thailand, and (iii) suggestions.

(2) A Semi-structured interview guide was developed to collect qualitative data related to meaning and interpretation, components of model, development methods, and related problems and obstacles.

The verification of instrument quality was carried out for both validity and reliability. The validity of questionnaire was calculated from the IOC index as assessed by five experts and only items with IOC values of at least 0.60 were included in the final version of the questionnaire. As for the instrument's reliability, the adjusted questionnaire was distributed to a compatible group of 30 respondents, and the data returned were used to calculate Cronbach's Alpha coefficient. The reliability of the whole questionnaire was 0.938.

3.3 Procedures in Conducting Research

The research procedures were in four steps as follows:

Step 1 : Study and review of concepts, theories, documents and previous research related to digital leadership development, in order to formulate a conceptual framework for digital leadership development of school administrators in science schools in Thailand.

Step 2 : Assessment of the current and desirable conditions of digital leadership development of science school administrators in Thailand.

Step 3 : Development of a proposed digital leadership development model for science school administrators in Thailand.

Step 4 : Evaluation of the suitability and feasibility of the proposed model.

4. Data Collection

The researchers collected data through the constructed questionnaire and the semi-structured interview guide, both offline and online in January-March 2022.

5. Data Analysis

There were two stages in analyzing the obtained data:

(1) The quantitative data analysis consisted of two parts: The respondents' personal data analyzed by descriptive statistics--frequency and percentage, while the data on digital leadership development of science school administrators analyzed by means, standard deviation, and the Priority Needs Index (PNI Modified). The interpretation criteria of the Likert-type five-point scale regarding the levels of the current or desirable conditions were as follows:

The mean score between 4.50 - 5.00 = Very High
The mean score between 3.50 - 4.49 = High
The mean score between 2.50 - 3.49 = Moderate
The mean score between 1.50 - 2.49 = Low
The mean score between 1.00 - 1.49 = Very low

(2) The qualitative data analysis was by content analysis with specifically classified responses. The researchers also used the information from relevant government documents, literature and related research reviews, as well as comments from five experts to conclude the triangulated data for the digital leadership development model for science school administrators in Thailand.

6. Research Results

The analyzed results revealed three major aspects of the digital leadership development model for science school administrators in Thailand: (1) overall development model, (2) development methods, and (3) key characteristics, as presented in Tables 1-3.

Digital Leadership Components

Table 1: Overall Development Model: Digital Leadership Components

Digital Leadership Components	**Current Condition**				**Desirable Condition**				**Priority Needs**		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1. Modern Vision	3.53	0.64	High	5	4.78	0.56	Very high	2	0.268	Weakness	1
2. Digital Professional Skills	3.63	0.58	High	2	4.82	0.49	Very high	1	0.221	Strength	4
3. Data-Driven Competence	3.56	0.57	High	4	4.56	0.54	Very high	4	0.259	Weakness	3
4. Knowledge Management	3.61	0.63	High	3	4.63	0.55	Very high	3	0.263	Weakness	2
5. Digital Learning Culture	3.74	0.58	High	1	4.52	0.48	Very high	5	0.219	Strength	5
Total	**3.61**	**0.60**	**High**		**4.66**	**0.52**	**Very high**		**0.246**	**Weakness**	

Table 1 shows the current condition of digital leadership development of science school administrators in Thailand as a whole at a high level (mean=3.61, S.D.=0.60), and the desirable condition at a very high level (mean=4.66, S.D.=0.52). All five components of digital leadership were rated at a high level for the current condition, and a very high level for the desirable condition. The value of the total priority needs index (PNI Modified) was at 0.246, which was classified as a weakness of the organization. Except for digital professional skills and digital learning culture, the remaining three components--modern vision, data-driven competence, and organizational knowledge management were in the weakness category.

Table 2: Development Methods: Current Condition, Desirable Condition and Priority Needs of Digital Leadership Development of Science School Administrators in Thailand

Development Methods	**Current Condition**				**Desirable Condition**				**Priority Needs**		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1. Digital Self-Learning	3.65	0.73	High	1	4.64	0.58	Very high	1	0.198	Strength	5
2. Online Self-Learning	3.45	0.68	Moderate	3	4.60	0.57	Very high	2	0.223	Strength	4
3. Online Training	3.62	0.75	High	2	4.58	0.49	Very high	3	0.259	Weakness	3
4. Online Study and Certification	3.41	0.71	Moderate	4	4.51	0.47	Very high	5	0.302	Weakness	1
5. AI- learning via Human Resource Management System	2.98	0.66	Low	5	4.53	0.52	Very high	4	0.296	Weakness	2
Total	**3.44**	**0.70**	**Moderate**		**4.57**	**0.52**	**Very high**		**0.255**	**Weakness**	

Table 2 reports five development methods specified for the assessment: the current conditions were diverse from low to high levels, making the total assessment at a moderate level (mean=3.44, S.D.=0.70). Digital self-learning and online training methods were highly favored, followed by online self-learning and online study and certification at a moderate level, and AI-learning through the human resource management system at a low level. The desirable condition total mean score was at a very high level (mean=4.57, S.D.=0.52). All five development methods were well rated at a very high level, with digital self-learning and online self-learning coming first and second in ranking, while online study and certification came last among the five. The value of total priority needs index (PNI Modified) was 0.255, indicating as a weakness of the organization. When considering the development methods, the researchers found only two development methods--digital self-learning and online self-learning categorized in the strength group. The remaining three methods--online training, online study and certification, and AI-learning through the human resource management system, were in the weakness group.

Table 3: Key Characteristics: Current Condition, Desirable Condition and Priority Needs of Digital Leadership Development of Science School Administrators in Thailand

Key Characteristics	**Current Condition**				**Desirable Condition**				**Priority Needs**		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
1. Diversity Awareness	3.51	0.72	High	7	4.63	0.56	Very high	6	0.298	Weakness	1
2. Influencing Ability	3.58	0.67	Moderate	6	4.59	0.49	Very high	7	0.261	Weakness	4
3. Good Governance	3.72	0.68	High	4	4.68	0.55	Very high	5	0.228	Strength	5
4. Information Management	3.86	0.67	High	1	4.75	0.48	Very high	3	0.267	Weakness	3
5. Clear Targeting	3.69	0.65	High	5	4.79	0.52	Very high	2	0.220	Strength	6

Key Characteristics	Current Condition				Desirable Condition				Priority Needs		
	$\bar{x}$	S.D.	Level	Rank	$\bar{x}$	S.D.	Level	Rank	PNI Modified	Group	Rank
6. Aim for Achievement	3.82	0.58	High	2	4.72	0.45	Very high	4	0.196	Strength	7
7. Learning Agility	3.78	0.63	High	3	4.81	0.50	Very high	1	0.276	Weakness	2
Total	**3.69**	**0.65**	**High**		**4.71**	**0.50**	**Very high**		**0.249**	**Weakness**	

As shown in Table 3, the current condition of digital leadership development relating to key characteristics of science school administrators in Thailand in seven dimensions posed for assessment revealed that except for the moderately rated influencing ability, other remaining six dimensions of key characteristics were highly rated by the respondents, resulting in a high level (mean=3.69, S.D.=0.65). Among the high-ranking characteristics, information management skills came first (mean=3.86, S.D.=0.67), followed by the aim for achievement (mean=3.82, S.D.=0.58), learning agility (mean=3.78, S.D.=0.63), good governance (mean=3.72, S.D.=0.68), clear targeting (mean=3.69, S.D.=0.65), and diversity awareness (mean=3.51, S.D.=0.72), respectively. For desirable conditions, all seven characteristics were rated at a very high level (mean=4.71, S.D.=0.50), falling under the very high level. In terms of ranking, the first three very high ranked were learning agility (mean=4.81, S.D.=0.50), clear targeting (mean=4.79, S.D.=0.52), and information management skills (mean=4.75, S.D.=0.48). The consecutive order of the remaining four characteristics was from achievement (mean=4.72, S.D.=0.45), good governance (mean=4.68, S.D.=0.55), diversity awareness (mean=4.63, S.D.=0.56), to influencing ability (mean=4.59, S.D.=0.49).

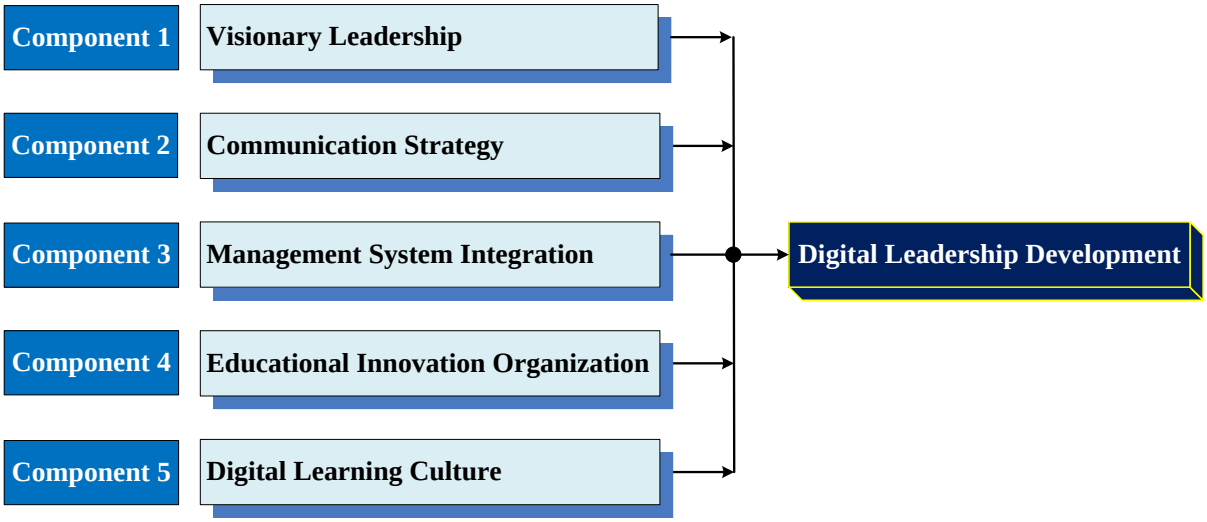
The total priority needs index was 0.249, considered as weakness of an organization, with four characteristics--diversity awareness, learning agility, information management, and influencing ability as weaknesses, and three characteristics--good governance, clear targeting and aim for achievement as strengths.

The Proposed Digital Leadership Development Model for Science School Administrators in Thailand

The proposed digital leadership development model for science school administrators in Thailand was based on the related literature review, content analysis, expert groups on government strategies and policy guidelines to utilization of advanced technology in educational management, especially in providing quality teaching and learning for young talents in organizations, particularly science schools. The researchers used the obtained quantitative data from the current study to help construct the target model as follows:

(1) The components of the digital leadership development model for science school administrators in Thailand consisted of (i) Visionary Leadership, (ii) Communication Strategy, (iii) Management System Integration, (iv) Educational Innovation Organization, and (v) Digital Learning Culture, as shown in Figure 1.

Figure 1: Components of Digital Leadership Development



How to develop the digital leadership model with key components and sub-components was by:

(1) Visionary Leadership: (i) determine the organization's goals, and (ii) determine the organization's digital information infrastructure;

(2) Communication Strategy: (i) defining a culture based on continuous and rapid feedback on the network, (ii) defining engagement through engagement, and (iii) leveraging digital communication tools to lead teams to take part in virtual;

(3) Management System Integration: (i) database preparation and coding (data collection and coding) and (ii) content management system or CMS;

(4) Educational Innovation Organization: (i) innovative leadership, (ii) innovative climate, and innovative behavior for teachers and educators; and

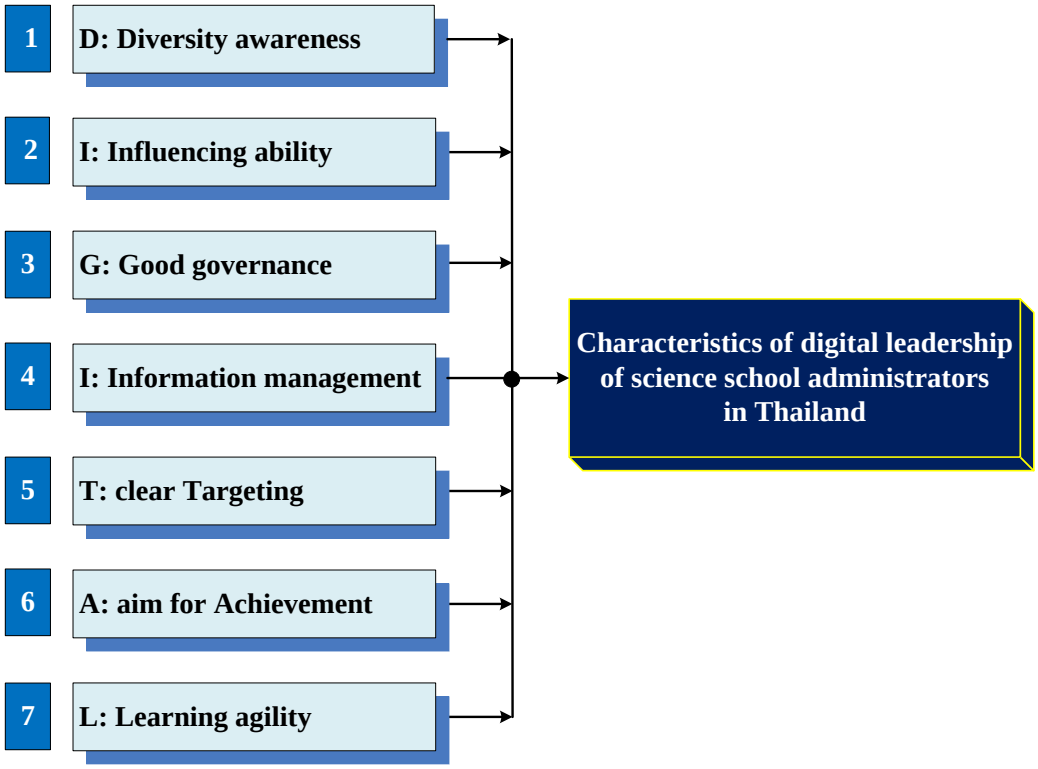
(5) Digital Learning Culture: (i) management collaboration, (ii) knowledge management, and (iii) motivating and controlling.

The *strategic goals* of the digital leadership development model aimed at empowering the science school administrators with (i) Inspiration, referring to executive ability to lead participative development and shared vision by integrating comprehensive educational technology to promote excellence in science for learners; (ii) Confidence, referring to commitment to continuously develop a digital-based science learning model for learners with confidence; (iii) Time management, referring to managing time of use and access to digital systems to create optimum educational technology integration and professional growth; (iv) Transformation, referring to aim of change to increase the efficiency and achievement of learning goals with appropriate technology and educational resources; and (v) Virtual Reality, referring to creating awareness and understanding of the digital world with virtual reality and its impacts on social issues, ethics, regulations, and responsibilities bonded to digital culture.

As seen in Figure 2, the *characteristics* of digital leadership model for science school administrators in Thailand consisted of seven dimensions with the abbreviation of "DIGITAL," where the first "D" stands for Diversity awareness, "I" for Influencing ability,

"G" for Good governance, "I" for Information management, "T" for clear Targeting, "A" for aim for Achievement, and "L" for sequential Learning agility.

Figure 2: Characteristics of Digital Leadership of Science School Administrators in Thailand



The data triangulation technique and connoisseurship by five experts suggested that the main activities of digital leadership development can be done in five ways: self-development, exemplary practice, case studies, experiential teaching and training. The secondary development activities are exchanging knowledge-using media, technology and modern educational innovations studied by models and learning through experience. In policy terms, it may be defined as a leadership development process using the PIER process: (i) Planning (P), (ii) Implement (I), (iii) Evaluation (E), and (iv) Reflection (R), which can serve as a clear annual policy and work plan for science schools in further development of executives at all levels.

It should be noted that school administrators and personnel should have functional digital skills to work effectively in their organization. The research results clearly showed that the demand index was the most essential attribute for an active digital user. In order to activate the use of digital technology, data management, data link and operations through digital communication must be appropriate and effective for the organization. Additionally, science school administrators and related agencies should train digital skills in their personnel as active digital users. Furthermore, school administrators, academics, researchers, or experts concerned can apply the digital leadership development model as a training platform to enhance digital skills of personnel and maximize their potential so that they can serve well in the management system under the leadership development model.

7. Discussion

According to the research objectives, the obtained results were discussed as follows:

(1) As shown in the study, the digital leadership development model for science school administrators in Thailand was highly rated, and its desirable conditions for developing digital leadership in science school administrators were rated at a very high level, indicating the need for empowerment of school administrators to manage science schools toward excellence by international standards. This point was in line with the findings in Phakamach et al. (2021c) and Carvalho et al. (2022), which emphasized that administrators of science schools in the reform era had to possess a vision and innovative leadership to manage science education suitable to change in providing for learners with quality education and competitive learning outcomes. The result as such was consistent with research by Gil et al. (2018), Sriboonnark (2020), Chandra et al. (2021), and Petchroj (2022)--all reporting that educational institutions should focus on transforming educational organizations into innovative organizations in the rapidly changing digital age. In particular, Gil et al. (2018) and Chandra et al. (2021) proposed 12 essential factors for consideration, some directly related to digital technology, such as determining the proper hardware, software, and digital platforms. Hakansson Lindqvist & Pettersson (2019), Busse & Weidner (2020), Suksaen & Trairat (2021), and Tulowitzki et al., 2022) also revealed similar research findings that "digital competences" were required of modern education administrators, especially digital mobility or integration, digital competence, and understanding how technology affects education. Therefore, the development of ICT for education and digital skills of executives and personnel has to be emphasized and practiced in educational organizations, particularly in science schools.

(2) The confirmation of experts' opinions and empirical data analysis in this study reflected priority in human resource development in science school implementation. To empower school administrators with digital knowledge and competencies and time management skills would lead to their courage and initiative in coping with change in science schools. In addition, the digital learning culture can help school administrators to keep pace with the disruption of education and learning technology to professionally and practically lead the organization to transform its culture to fit in new technology. This point was consistent with the Thai education management guidelines toward Thailand 4.0 in putting digital technology into education (Sinlarat, 2020; Phakamach et al., 2021a). The proposed model for developing digital leadership in science school administrators, when properly implemented, would add to the strengths of science school operations in Thailand to a certain extent.

8. Suggestions

On the basis of the obtained findings, the researchers would like to suggest two points:

(1) The research results revealed the gap between total current and desirable conditions, indicating the perception of the respondents that science school administrators need digital leadership skills development. In this regard, further investigation is needed to ensure priority and details of the development. Besides, the implementation of the proposed digital leadership development model requires consideration of the contextual circumstances of educational institutions--professionally, physically, and environmentally.

(2) The proposed digital leadership development model's validity and applicability could be further assessed with larger relevant sample groups in comprehensive secondary schools to understand the real needs for digital literacy by concerned parties working at the time of digital disruption. To the researchers of this study, an in-depth case study could shed more light on the implementing method of the proposed model for digital competency development of science school administrators, and support personnel and learners as significant and critical stakeholders in the long run.

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Design Development of Environment and Facilities for Disabled Workers in Department Stores and Large Wholesale-Retail Businesses: A Case Study of Mahatai Foundation

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Abstract

The purposes of this research were: (1) to identify needs of disabled persons and their obstacles at work, (2) to develop workplace facilities to increase the work efficiency of disabled persons, and (3) to evaluate the effectiveness of the designed workplace facilities for disabled persons. The design development of the workplace facilities was targeted at two types of disabilities--physical disability and vision impairment. The researcher used a triangulation method combining questionnaire, semi-structured interview and observation to validate the obtained data. Three research instruments yielded data for product development process using the principle of Universal Design. The designed facilities were trialed with disabled workers at Mahatai Foundation in Chonburi Province. The results revealed that disabled workers were able to working cooperatively with others but they needed suitable facilities in appropriate working environment. The results on the newly developed workplace facilities supported work efficiency of disabled workers. They were able to use the facilities quickly with a good motivation at work. The newly designed facilities proved reducing risks at accident during working time.

Keywords: *Disabled persons, workplace facilities, work environment, universal design, work efficiency, Mahatai Foundation*

1. Introduction

The development of the country is essentially an equal opportunity provided for people of all ages to have a decent living. Disadvantaged people, the disabled, the elderly, and other low socio-economic groups may be deprived of basic necessities and facilities in life to a certain extent.

Currently, Thailand has to cope with the elderly in becoming an aging society. However, one urgent issue seems to rest upon how to support disabled people to work with normal colleagues; the authorities concerned need to take into consideration appropriate design for the work environment, equipment, and facilities so that people with disabilities can work and live comfortably alongside with those without physical limitations.

As known, people with disabilities have human dignity, rights and liberty to be protected as Thai citizens. They should be independent in their way of living at a full potential of each individual. They should not be discriminated against regarding education opportunities and occupations. Disable persons are entitled to basic education to higher education like other ordinary citizens. It means that the government needs to provide suitable transportation and access to designated places for those with physical limitations. As seen in Bangkok, there are ten primary schools for people with certain types of disabilities. Secondary education for disabled persons is co-educational with public schools and accepts disabled students with good academic results and active learning ability. As for higher education, Suan Dusit Rajabhat College and Rajasuda College Mahidol University are open to the disabled to study including those with hearing impairment but still not covering all types of disabilities As of now, occupational development for the disabled is lacking (Pruettikomon, 2019) and social enterprise as a new alternative on how to change the attitudes of the general public toward the disabled. Career guidance enables people with disabilities to be able to rely on themselves with pride—feeling empowered to live independently and become part of the society on an equal footing with normal people (Pruettikomon, 2019). Career promoting guidelines generally deal with zero discrimination and ample employment opportunities. In particular, the government has restrictions on vocational training for disabled people. The researcher wanted to find a model and a guideline to promote occupational groups for the disabled, and planned to put forward the social business development model in support of the disabled.

To improve the quality of life for disabled people, it is imperative to secure cooperation from many parties concerned in society—in the government and private sectors. The study by Pruettikomon (2019) reported that there are four basic disability rehabilitation systems that support facilities for the disabled--vocational, medical, educational and social rehabilitation--and create environmental facilities along with attitudes of

normal people toward disabilities (National Committee for the Promotion and Development of the Quality of Life of Persons with Disabilities, 2010). There is a need to integrate disabled people into the main social stream by providing them access and positive environment via currently available technology as well as knowledge so that they can work with other normal social members.

It can be said that the environment and facilities are the key factors to support disabled people to work routinely with efficiency. The design should be based on their identified needs and other relevant information obtained from a standard assessments of their physically limited performance by normal supervisors and colleagues for further improvement. In this regard, the researcher combined quantitative and qualitative research methods to collect data from a survey, a questionnaire, an observation scheme and brainstorming sessions from various parties concerned. The researcher expected to use the obtained information for design development of work environment as well as facilities in the office context. The researcher also planned to evaluate those newly created work environment and facilities in terms of their practical functionality.

2. Research Objectives

The research carried three objectives:

2.1 To identify needs of disabled persons and their obstacles at work, regarding behavior, environment, and encountered problems in the offices of large wholesale-retail department stores as data for the design of the work environment and facilities.

2.2 To develop workplace facilities to increase the work efficiency of disabled persons in the offices of large wholesale-retail department stores.

2.3 To evaluate the effectiveness of the designed work environment and workplace facilities for disabled persons in the offices of large wholesale-retail department stores.

3. Research Methodology

3.1 Population and Sample

3.1.1 The population used in this research consisted of 1255 disable persons from department stores or large wholesale businesses in Bangkok.

3.1.2 The sample group used in this research was disabled persons selected by the stratified random sampling method of Krejcie and Morgan (1970) on three retail-wholesale businesses: (1) C.P. ALL Public Company Limited: 156 persons at Makro, (2) Big C Supercenter Public Company Limited: 103 persons (Big C), and (3) Ekkachai Distribution System Co., Ltd.: 35 persons at Lotus's.

Three sample groups were as follows.

Group 1 provided data on work environment, problems and design requirements for the mass in operations conducive to the design of facilities in the work of disabled people in the large wholesale businesses and department stores in Bangkok. The total number was 260 divided into: (1) C.P. ALL Public Company Limited: 138 persons at Makro, (2) Big C Supercenter Public Company Limited: 91 persons at Big C, and (3) Ekkachai Distribution System Co., Ltd.: 31 persons at Lotus's.

Group 2 provided data on work environment, problems and design requirements for the mass in operations conducive to the design of in the work of disable people in the large wholesale businesses. The total number was 14 divided into: (1) C.P. ALL Public Company Limited: 7 persons at Makro, (2) Big C Supercenter Public Company Limited: 5 persons at Big C, and (3) Ekkachai Distribution System Co., Ltd.: 2 persons at Lotus's.

Group 3 provided data on satisfaction with Facility Design Model on disabled people in department stores or large wholesale businesses. The total number was 20 divided into (1) C.P. ALL Public Company Limited: 11 persons at Makro, (2) Big C Supercenter Public Company Limited: 7 persons at Big C, and (3) Ekkachai Distribution System Co., Ltd.: 2 persons at Lotus's.

3.2 Research Instruments

The researchers used a triangulation method combining questionnaire, semi-structured interview and observation to validate the obtained data. Each instrument was constructed with specifications and rechecked by three experts in design and development for disabled workers in the workplace.

4. Data Collection

The researcher used five steps in collecting data.

4.1 Gathered information on the behavior of the visually impaired, completely blind, partially blind, physically handicapped and the official impaired hearing to understand their problems and obstacles at work.

4.2 Collected information on devices that help to enhance the perception of touch, ways of living with the general public of the visually impaired, the interactions among the visually impaired/ hearing impaired/ physically handicapped and close friends/ colleagues working/ having work experience at Mahatai Foundation.

4.3 Studied the process of design onto product development to meet the specific needs of disabled employees to suit their work.

4.4 Designed and developed environments and facilities for disabled persons working in the offices of large wholesale-retail department stores/ shopping malls to support those visually impaired workers.

4.5 Approached three assessment experts on environment and facilities of disabled persons to select a suitable model by evaluating and using the obtained data to analyze decision alternatives to reach an appropriate selection.

5. Research Data

The researcher reported the obtained data in nine categories.

5.1 The Samples under Study

The population of this study was those physically disabled and visually impaired persons working in large retail-wholesale businesses.

There were two types of people with disabilities from birth and those from and accidents. Other two types of visually impaired people were either naturally blind or blind from a cause later in life. They worked as telephone operators at Mahatai Foundation--a center for quality services by disabled workers. They worked on a long-term performing on tasks ranging from center surveying, research, co-working, to packaging and shipping in a team of quality and responsibility as assigned.

This research focused on disabled persons in two categories--the physically handicapped and the visually impaired as the target groups. The

researcher used Mahatai Foundation as the training facility context in preparing people with disabilities prior to their work in actual retail-wholesale businesses or department stores. The details of three groups of samples were as given in Subsection 3.1.2.

5.2 Representatives in Testing the Product Performance

Thirty disabled employees--15 physically disabled and 15 visually impaired at Mahatai Foundation--provided data on the tested product performance, as shown in Tables 1 and 2.

Table 1: Data Collection at Mahatai Foundation Chonburi from 15 Physically Disabled Representatives in Testing the Product Performance

Name [consent given]	**Age**	**Gender**	**Cause of disability**
1.Kitiphat	22	Male	Congenital
2.Phasada	38	Male	Accident
3. Weerawat	33	Male	Accident
4. Anganet	20	Male	Congenital
5. Sirikan	27	Female	Accident
8.Yuwathon	29	Male	Accident
7. Sorat	40	Male	Accident
8. Chatchai	38	Male	Congenital
9. Juthamas	28	Female	Congenital
10.Kuekoon	21	Male	Accident
11. Sister Pang	26	Female	Congenital
12. Yuwan	29	Female	Accident
13. Songkran	43	Female	Accident
14. Nongnook	41	Female	Accident
15.Manee	41	Male	Accident

Note: Table 1 shows 10 persons from accidental disabilities and 5 persons with disabilities from birth.

Table 2: Data Collection at Mahatai Foundation Chonburi from 15 Visually Impaired Representatives in Testing the Product Performance

Name [Consent given]	**Age**	**Gender**	**Cause of disability**
1.Nathee	20	Male	Blur blind
2.Kanya	32	Female	Blind
3.Nammon	35	Female	Blur blind
4. Patthama	26	Female	Blur blind
5. Chankla	28	Male	Blind
6. Maythee	24	Male	Blur blind
7. Rungarroon	42	Male	Blind
8. Maneenart	35	Female	Blind
9. Sing	25	Male	Blur blind
10. Sister Yao	39	Female	Blind
11. Sister Kwan	36	Female	Blind
12. Chowvanit	28	Male	Blur blind
13. Komsan	45	Male	Blind
14. Nongyao	42	Female	Blind
15.Audom	47	Male	Blur blind

Note: Table 2 reports 9 completely blind persons and 6 blur blind persons.

5.3 The questionnaire asked for feelings and opinions about the satisfaction and effectiveness of educational and product design programs to assist the mobility and visually impaired people in their careers. The questionnaire items were validated in content validity by three experts in design development for people with disabilities. All respondents were asked to react to the designed product model.

5.4 Interviews carried both closed-ended and open-ended questions to secure information on what to develop and design products to ease mobility in physically disabled and visually impaired people at work.

5.5 Observation focused on behavioral details of the samples and information on the production of office furniture and facility items for the disabled in their work environment to conclude guidelines for product

development based on the data obtained from a digital camera and portable computers that save needed data and images.

5.6 The Use of Research Instruments

The researcher obtained data for analysis--ranging from sampling, a questionnaire, an interview scheme, an observation technique, along with electronic media, cameras, and recording devices. The respondents were to report their satisfaction with the newly created environment and facilities for disabled workers. The developed design was meant to assist people with mobility disabilities at work. The obtained data were analyzed for product development after the process used by Victor (2002).

5.7 Principles of Design Procedures

The researcher studied information on design principles and procedures from journals, books, the Internet and related research. The data were also secured by field surveys, observations, notes and interviews in designing and operating in planned steps. The target design needs to suit disabled workers' use in terms of position, location, aesthetic features, and design inspiration to be accepted by consumers in the target market among competitors. The design principles account for consumers' acceptance in terms of aesthetic features as well as good quality of the finished products.

5.7.1 Analysis of 5W1H Design Guidelines

The researcher used the obtained data to analyze product properties and create design guidelines in the steps as follows:

Have mobility features for those workers with visual disabilities.

Need tables for the disabled and the visually impaired.

Need location for furniture and office equipment to be installed in office space or suitable area.

Be functional during work time or doing activities on the desk.

Be responsive to why and when for mobility of visually impaired workers' tasks on the designed desk.

Be responsive to how to tackle arising problems to meet the needs of users for maximum utility.

5.7.2 Data Analysis for Design by SWOT Analysis

Strengths

Mobility for visually impaired people in using designed furniture to meet the needs of target workers.

Weaknesses

The use may cause inconvenience to some normal users who do not wish to co-work with disabled workers.

Opportunities

With mobility for visually impaired workers, the created office furniture could be applied in functionality to normal workers to create a sense of equality in occupation.

Threats

The issue of safety in the design for disabled workers could pose a threat to an organization to spend more on special office furniture to suit disabled workers. There were four types of disabilities to cope with: physically handicapped from birth, physically handicapped by accident, partially visually impaired, and completely blind. In this regard, the design principles primarily require safety and convenience in use (Lin & Wu, 2015).

5.8 Analyzed Data

Observation and interview data on mobility disabilities were from the disabled workers' opinions as responses to both the open and closed questions. These data made it possible for the researcher to draw conclusion on the design development for disabled workers. The researcher classified data as follows:

Part 1 Data obtained from the sample group via interviews.

Part 2 Data on disable problems identified by three experts for the design development of office furniture and equipment suitable for the disabled and the visually impaired at work.

Part 3 Data on disabled users' satisfaction with the designed environment and facilities for disabled workers in large retail-wholesale department stores.

Part 4 Statistical data on designed furniture and office equipment for the disabled and the visually impaired at work.

As for the *satisfaction* meanings on the scale of 1-5, the researcher specified:

4.50 – 5.00 highest satisfaction
3.50 – 4.49 high satisfaction
2.50 – 3.49 moderate satisfaction
1.50 – 2.49 low satisfaction
1.00 – 1.49 lowest satisfaction

As for the *performance* meanings on the scale of 1-3, the researcher specified:

2.50 – 3.00 the highest level performance

1.50 – 2.49 the moderate level performance

1.00 – 1.49 the lowest level performance

The researcher used data as percentage, arithmetic mean, design drawings and procedures.

5.9 Product Development Process

Figures 1-4 show the process of design development of environment and facilities for disabled workers in large retail-wholesale businesses or department stores.

Figure 1: Brainstorming for Product Development and Identifying Disable Problems at Mahatai Foundation (1)

Figure 2: Brainstorming for Product Development and Identifying Disable Problems at Mahatai Foundation (2)

Figure 3: The Design Concept for the Mass as a Guideline for Design Development

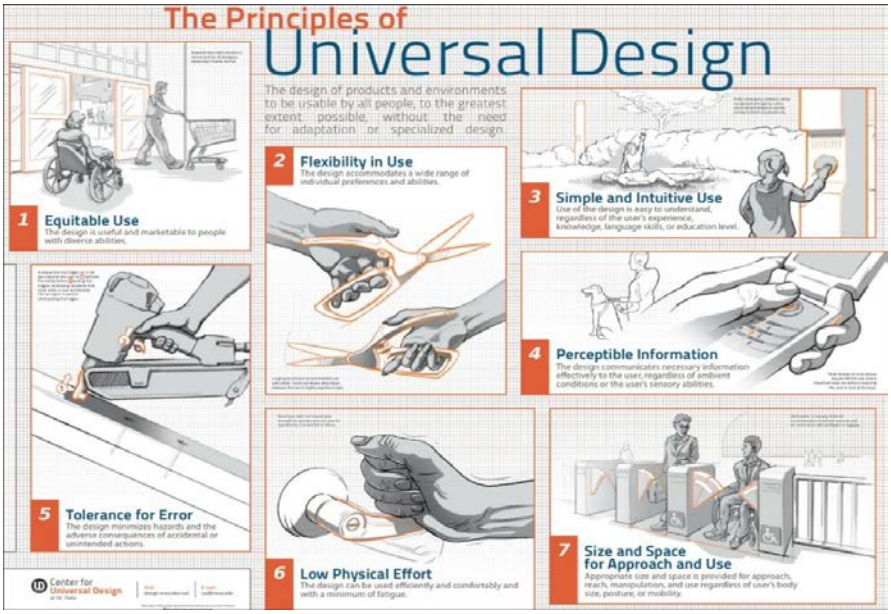


Figure 4: Drawing Development of an Office Furniture Adjusted to the Size of a Wheelchair for the Physically Handicapped

As shown in Figures 1-4, the researcher collected data needed for a guideline to the design development of adjustable tables for wheelchair seats. There were two types of wheelchair seats for the disabled or leg-injured. Those with an injured leg can still walk but need to sit with arm or hand support. There are various needs, such as a handicapped person needs

a hand or a mechanical arm to ease their mobility. Finger disabilities may require gloves or a hand-grip device; finger disabilities need a keyboard for finger disabilities and a computer mouse for feet (Saito, 2006).

The researcher wanted to design facilities for people with mobility impairments, especially those on wheelchairs. Different sizes of wheelchairs were a common problem for the disabled to move to a normal office chair--making it not convenient for disabled workers when going to the bathroom. Access to a low power plug could be a problem when bending down to reach it. The storage position of personal equipment also posed a problem to those on wheelchairs to store lunch boxes, drinking water, tea, coffee, and other personal belongings. The researcher therefore listed design guidelines in two main aspects: (1) using the standard size wheelchair, and (2) designing an office table to fit the wheelchair size. These design guidelines were to meet the needs of disabled workers economically and cost-effectively.

The design guidelines encompassed four parts as follows:

(1) The high-shaped office desk (Top) is a concave shape (Curve) to accommodate a wheelchair and can be adjusted up and down to fit in the wheelchair. The height can be adjusted between 70-90 centimeters, which can be adjusted up to the maximum of 20 centimeters to fit a manual/ motored wheelchair.

(2) The location of the power plug and the height of the edge of the table and the design of the back cover to prevent dropping were to help disabled workers to reach or store things conveniently.

(3) The storage area was designed to have a side table to store personal items, particularly utensils to be cleaned or washed easily.

(4) The floor materials require viscosity. Most disabled workers live close to their workplace and can travel to and from on their own. The floor with increased viscosity will allow them to use and clean the floor by themselves. In addition, their cloth bag hung on their wheelchair can easily store their personal belongings. The path in the main area of the office space should be clear from obstruction of all kinds to avoid stumbling or tripling that may occur.

The guidelines deal with identified or foreseen problems with the disabled's environment or facilities, and particularly allow them to be seated in wheelchairs when working in the assigned office space conveniently, as shown in Figures 5-10 from the first to the second draft of design development.

Figure 5: Conceptual Design Image Improved from the First Developed Draft: The Second to the Third Draft

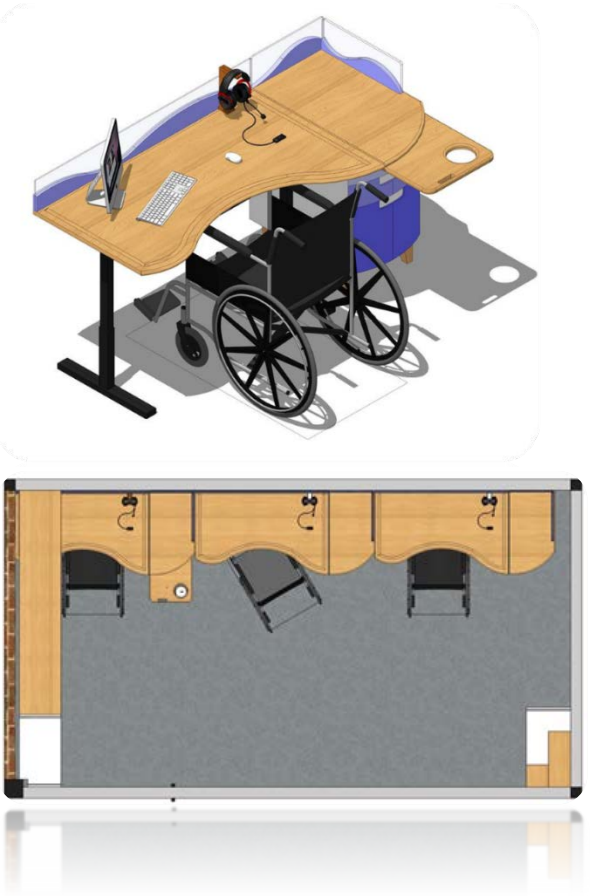


Figure 6: Note-Taking Device for the Visually Impaired Based on Braille.

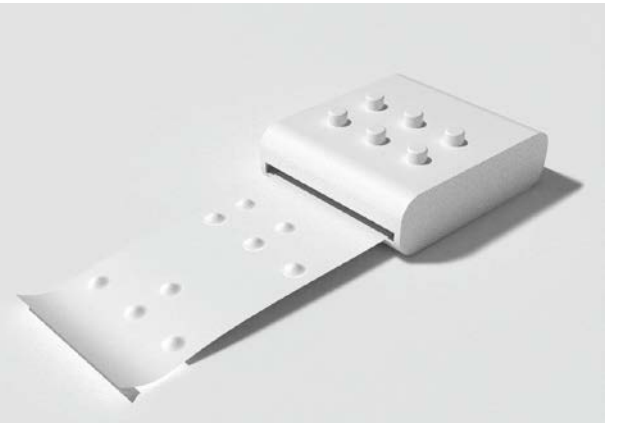


Figure 7: Electrical Shock Protection Device for the Visually Impaired

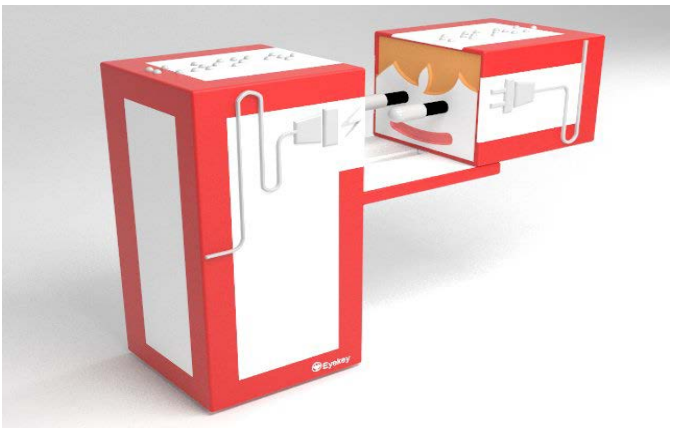


Figure 8: Paper Punching Device for the Visually Impaired or Workers with Weak Arm Muscles

Figure 9: The Pen for Writing Notes for the Physically Handicapped or Workers with Weak Arm and Hand Muscles

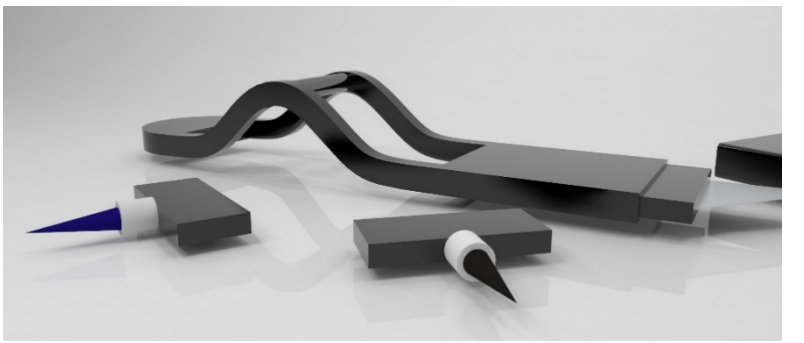
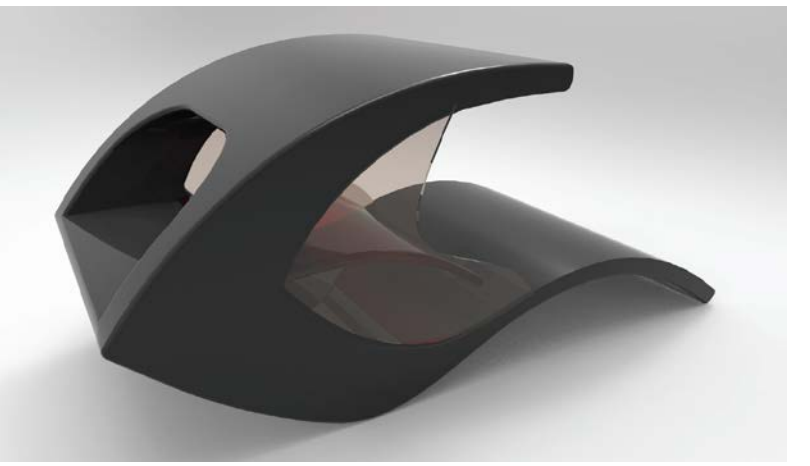


Figure 10: A Mouse for Computer Work for Disabled People Using a Foot



6. Results and Discussion

The researcher analyzed the obtained data on designed desks for workers with mobility and visual impairment, and then secured interview data from disabled workers as well as three furniture and electronics specialists.

6.1 The Disabled

The executive of Mahatai Foundation said that standard size office furniture and equipment are not suitable for people with mobility disabilities at work. There should be more space for wheelchair access and safety.

6.2 Furniture

One specialist in mobility disabilities emphasized planning for the installing procedures, selection of materials and methods of use, styles and properties of each material type, creativity for the designed furniture for ease, durability, and safety.

6.3 Electronics

One specialist asserted that electronic systems be used in testing the structure regarding the ease of use and safety to prevent electric shock.

The results from the study showed what and how the designed product can come directly from people with mobility disabilities and stakeholders concerned. The universal design principles can be applied to specific work environment for those workers who are physically handicapped or visually impaired. As shown, the work table needs to be adjustable with an electric system to suit those who have muscle weakness. It is important for a designer to modify the target facility for safety, convenience, and functionality as the primary concerns (Lin & Wu, 2015).

From the preliminary data collection, the respondents considered the importance of furniture for safety as well as the use of colors, sizes, proportions, as well as material types used in production. The survey yielded satisfaction data; the use of mobile camera in support of the data obtained from the questionnaire helped set a guideline for designing and producing a prototype.

The analyzed data revealed that people working in large wholesale and retail department stores were dominantly females (F=58.33%, M=47.67%), and the average age ranging from 20-60 years (80%), having completed primary education (50%), and with a bachelor's degree (25%), working periods were 0-1 years (52.49%), and those worked 1-5 years (33.33%). Those disabled respondents were in the clothing department (14.16%); the hearing impaired respondents were telephone operators (14.16%) and visually handicapped and wheelchair-bound (12.50%). It should be noted that the purchasing department doesn't want people with disabilities to work for fear of affecting the image of good health.

The majority of the disabled respondents earn more than 10,000 baht per month, with food allowance of 500 baht per month (50%), the salary from 10,000-15,000 baht per month (25%) based on assigned duties. Some supervisors noted that people with disabilities may not be able to work toward organizational goals. From their observation, people with disabilities

do not want to change position (80%) and tend to opt for rather easy tasks that do not require much thought and risk. However, the use of teamwork could help as an incentive for survival and cooperation in working toward the organizational goal (Sukiam, 2020).

The researcher observed that people with disabilities tend to view the environment and facilities as not supportive to their employment. In fact, the mindset of the disabled toward work challenges, organizational goals, and innovative contribution are of prime importance. Employment is not simply the way to earn one's living, but the path to fulfill one's goal toward the selected career as well as contributing to the growth of the organization. In this regard, the organization could consider work competency development for all employees to create good products and deliver quality of services with their collective efforts and cohesive collaboration (Sukiam & Likitsarun, 2021). It is important to instill a sense of unity by involving all employees to work together in a specific direction common in interest and benefit of all stakeholders.

From the questionnaire results, the disabled respondents felt that they were not able to perform at the level of their colleagues (80%). For them, the problem areas were offices (10%) and warehouses (20%), inadequate facilities (66.67%), problems with power sockets (40%), office desks and (30%), elevators (10%), and internal paths/ toilets/ canteens/ warning signs in case of emergency (10%).

The majority of the disabled respondents experienced accidents at work, (58.00%) from electric leak, falling objects, stairs, bumping into objects, knives, and forklifts. They wished for friendly environment and facilities (66.67%). To the researcher, communication is vitally important to the hearing-impaired workers and they need safety when using office furniture and equipment.

The disabled respondents preferred materials made of wood and with smooth surface (41.67%) and in square shape (41.67%). Desks and cabinets should require designs suitable for disabled people (41.67%); computer sets and power sockets should be easily accessible for those with physical disabilities. Communication devices between supervisors, normal colleagues and people with disabilities should deserve a full attention for clear understanding of assigned tasks and safety at work. As for the visually impaired, they certainly need appropriate office furniture to reduce accidents. A handicapped person in a wheelchair needs a new viewshare used for work

and desks suitable for work (58.33%). Office equipment like knives, cutters, staplers, hole punchers were mainly problematic to the visually impaired and physically handicapped (41.67%). The disabled respondents were willing to adapt themselves to obstacles at work (66.77%). Overall, the results from the questionnaire and interviews showed that disable workers need to have work suitable to their functional abilities so that the organization can use their competencies at a full potential for good results from increased work efficiency. It is therefore vitally important to create uniqueness of atmosphere in the workplace as a psychological impact on workers to feel comfortable and perform on assigned tasks efficiently (Ratchavieng, Srinet & Syers, 2021).

7. Conclusion

The researcher found that people with disabilities tried to develop their capacity in other areas to compensate for their physical limitations and they were in need of supportive disable environment. Only if the employer were willing to accommodate disabled workers in a suitable work environment and facilities, disabled employees would definitely contribute well to the growth and success of their selected organization. It is important for all stakeholders concerned to provide sustainable employment with appropriately designed work environment and facilities. According to the conceptual research framework presented by the researcher, it could bring to employers' attention a good balance of social, physical, and mental aspects for a society of equality.

The use of facilities that are friendly to disabled workers can be in conjunction with the government's law and its enforcement. As for people with disabilities in Thailand, the employer's step forward in redesigning work environment and office facilities has revealed good will for disabled members of society to have the opportunity to contribute to the country's economic growth in the long run—not to have manpower wasted due to discrimination against those who are less fortunate in society. In this flow of thought, the researcher felt particularly positive toward Victor's assertion in 2002 that people with disabilities and good talent can inspire underprivileged people to live a normal life in society (Victor, 2002).

8. Acknowledgements

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The Analysis of Cinemas in China after the End of COVID-19

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Abstract

The COVID-19 pandemic has severely impacted the worldwide film industry and related businesses. This year, mainstream movie theaters in every major country have been closed for months due to the economic downturn. This has resulted in the layoff of thousands of film industry workers and the suspension of production on dozens of upcoming films. The film industry around the world is currently experiencing a decline in revenue. Still, the film industry in China, in contrast to the U.S., has been performing exceptionally well and is showing no signs of slowing down. Movie theaters in China have recovered revenue since the COVID-19 pandemic was quickly controlled. With the implementation of new health and safety regulations, theaters around the world have begun reopening. Employees temporarily laid off can now return to their jobs, and many new ones have opened up since the lockdown was lifted. As the number of confirmed coronavirus cases in the United States continued to rise, movie theaters across the region were forced to cancel showings and keep their doors closed out of fear of spreading the virus. This paper reports how China has now surpassed the United States as the world's biggest box office, suggesting that the Chinese film industry is among the first to recover from the spread of COVID-19. The pandemic is not likely to discourage moviegoing, but it could significantly alter the cinematic experience.

Keywords: *Film industry in China, post-COVID-19, cinemas, Chinese's box office*

1. Introduction

The outbreak of the new coronavirus COVID-19 was called a global pandemic by the World Health Organization on January 31, 2020 (Beijing time) (Liu et al., 2020). This is not the first time in history that such a statement has been made. It has happened five times before. But the size and spread of the outbreak, along with the fear and anxiety of the people, have become a deadly mix (Mirza et al., 2020). This has led to financial and economic effects that were not expected, despite the lower death rate (Fu & Shen, 2020; Guan et al., 2020). Everyone's life has been changed in some way by these effects, which is why it has been called a global health emergency (Liu et al., 2020; Rizvi et al., 2020). People think the spread of the COVID-19 virus differs from the spread of other viruses that

plagued the world in the past (Reinhart, 2020). Viruses like Zika and Ebola popped up and were mostly found in certain parts of the world as having effects on economies worldwide (Baker et al., 2020). In the case of COVID-19, its outbreak was reported from Wuhan in Hubei Province, China.

Wuhan is one of the most important transportation hubs, and many people are always moving through it (Chakraborty & Maity, 2020). This pandemic started during an annual spring festival, during which the world's largest human migration occurs through this hub, making it worse. This is how the COVID-19 virus spread worldwide and caused a global outbreak. COVID-19 is one of the most infectious and contagious diseases in the world. Panic and confusion among people and institutions, along with the spread of COVID-19, have caused a lot of volatility and problems in several industries (Haroon & Rizvi, 2020). In this case, the Chinese government has already taken several steps and measures to stop the spread of the virus and the disease from worsening (Ashraf, 2020). For example, the immediate lockdown policy has been put into place globally. This means that all business activities have stopped, and people's movement has been limited or even stopped in some places. Also, people can't go from one place to another as easily as they used to, either within their own or in other countries (Ding et al., 2020). People were more confused because of these lockdowns, which made them rush to buy food and household supplies. This increased the gap between the demand for and supply of goods and services. In addition, the local governments of wealthy countries have announced several economical packages to help and compensate the people with food and other things they need to live on. These packages have helped the local people with food and other necessities to live during the pandemic. But putting these measures into place has lowered the level of economic production worldwide and caused a deficit, which can also be called "economic distancing." This is a situation in which many people have lost their jobs, and the incomes of millions of people worldwide have gone down (Park et al., 2020).

In the same context, Ashraf (2020) classified the government's actions to stop the outbreak into three main groups. In the first group, things were done to keep people apart, like closing parks, schools, and public transportation, encouraging people to work from home or with a small staff, and making it harder to eat in restaurants. In the second group, public awareness and containment measures were used to make people aware of the disease and keep it from spreading. People who were tested positive for COVID were put in quarantine. The third group was the government's financial aid programs, which included giving cash to poor households and families, lowering loan and debt payments, and lowering utility bills (Hepburn et al., 2020). Stock markets, which are seen as the place where smart, opinionated, and sane investors do business, have also had different returns on the actions taken by governments all over the world (Yarovaya et al., 2020). For example, social distancing measures could hurt the return because there haven't been many activities that bring in money or make the economy grow. On the other hand, government aid and income packages could lead to positive returns and boost investors' confidence in the market. So, the direct effects of these measures could be bad, but they are only temporary, so eventually, things should get back to normal, and operations should go on as usual. So, in a roundabout way, these steps help investors hold on to the hope that things will eventually return to how they were before.

The entertainment business has been hardly hit for its vulnerability and higher risk in human contacts than any other business during the pandemic (Hu et al., 2019; Gu et al., 2020). The closing of movie theaters stopped the flow of income from newly released movies, and the production of movies on the floor and the sets were not possible because the government did not allow people's gathering. Even though people spent more time watching TV and movies at home during the lockdown offered by media and entertainment agencies (Haroon & Rizvi, 2020), this did not generate income at the level of former activities before the lockdown. The new projects have been put on hold, there has been a decrease in employment, which has hurt those in the movie and entertainment business. These are negative effects on the economy on the stock markets and returns of the *film and drama industry* (FDI) (Hu et al., 2009). In short, investing in FDI became a waste of time for closure of movie theaters and other physical forms of entertainment, and there was a shift toward online entertainment platforms worldwide. These platforms give people easy access to entertainment content through the internet. However, many people have still longed for going to the movie theaters but needed to turn to online platforms in support of end users with easy access and reduced costs of distributing, screening, and creating new contents. FDI has been saved by online platforms during the COVID-19 pandemic. But this phenomenon still doesn't fully explain why this industry has so much untapped potential.

China with more than 1.3 billion people is one of the biggest markets for movies and TV shows. According to Statista (2021), China made 1,037 movies in 2019. Also, there are more than 50 chains of movie theaters in China run by different companies. Only "Guangdong Dadi Digital Cinemas" is said to have more than 1,120 movie screens. The total number of movie theater screens is more than 75,000, and there are about 11,300 movie theaters. Also, and this is the most important thing, the country has the biggest market based on the amount of money made at the box office, which was over USD 3 billion in 2020 alone. So, according to the goals set, the researchers would like to see more research into the size and nature of the relationship between FDI and COVID-19, especially in the case of China, which has one of the largest FDI industries in the world. Also, this should be done because China has the largest consumer base and has become a market for international companies to come and sell their goods.

2. Research Objectives

There were three objectives in this study:

1. To identify the extent of the COVID-19 impact on the worldwide film industry experienced by China during the pandemic.

2. To detect the post-pandemic impacts of COVID-19 on the worldwide film industry experienced by China.

3. To analyze the post-pandemic changes and developments in Chinese theatres and films.

3. Methodology

The study focused on the post-pandemic impact of COVID-19 on the worldwide film industry, especially as experienced by the Chinese film industry. So, this study was

exploratory in nature. The data were mainly collected from relevant secondary sources: articles, journals, newspapers, and books.

4. The Obtained Data and Interpretation

4.1 Film Industry during the Pandemic of COVID-19 in China

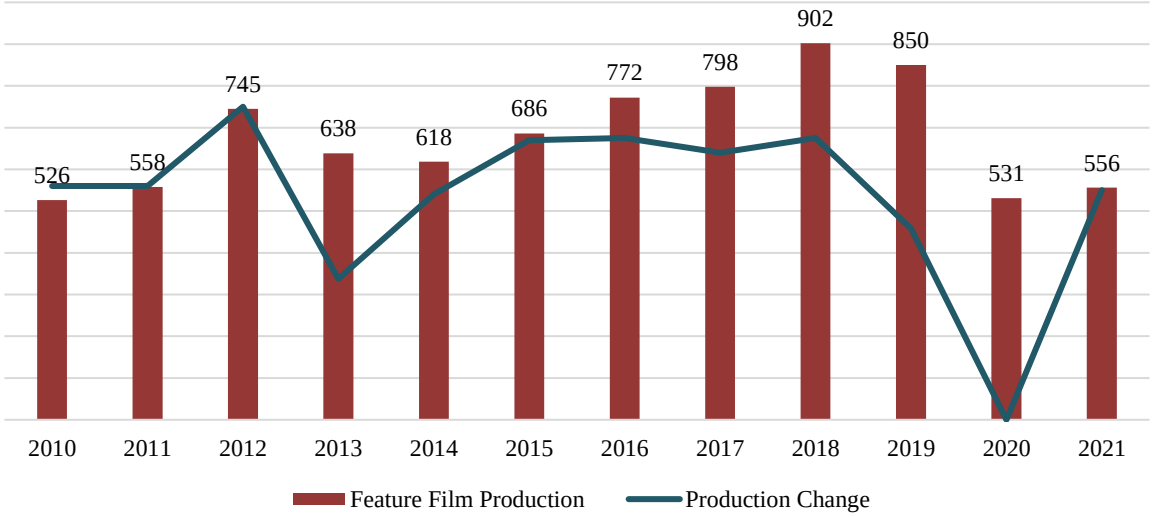
The COVID-19 pandemic has affected the world economy drastically. Since the world is experiencing a new pandemic, a misunderstanding over immunization and vaccination for its spread and management is causing alarm to the public and influencing people's spending habits (Haroon & Rizvi, 2020). Stock market patterns are a sane portrayal of investment or expenditure patterns, as they are made up of logical and sophisticated people who can forecast future trends and generate profits accordingly (Mirza et al., 2020; Tao et al., 2021).

As with the rest of the world's film industries in 2020, the Chinese film industry had a phenomenal year. Due to the rapid spread of the COVID-19 pandemic, the Spring Festival, which is a typically bustling period for the film business, was unusually quiet. Following then, the theaters remained closed for 178 days. Numerous film crews ceased production, and the film industry was forced to wait for conditions to improve. Several programs were initiated by central and local party leaders and government agencies at all levels to alleviate the burden of this calamity. On 20 July 2020, theaters began to reopen progressively, but they were required to adhere to strict safety regulations. A month later, when *The Eight Hundred* grossed more than 3 billion RMB at the box office, it signaled the return of the Chinese film market in RMB. During the National Day holiday, approximately 4 billion RMB was earned at the box office nationwide. This demonstrated that despite the pandemic, Chinese people still desired to attend the movies. *Sacrifice* produced in less than two months, and restored the confidence of the Chinese cinema industry. In 187 days, 2020 earned a total of 20.4 billion RMB at the box office. China took the lead in the global film business during this peculiar year. This indicates that the Chinese film industry and market were the first in the world to be revived (Statista (2021).

4.2 Big Change in Film Industry before and during the Pandemic COVID-19

Film production in 2020 continued the basic trend of declining numbers that had characterized the preceding two years. There were 531 feature-length films produced during the year, including animation, science and educational films, documentaries, and special films. Public screening licenses were issued for 650 domestic films. Figure 1, the downward trend in theatrical film production will likely continue as more films transition to online distribution. This was 37.5 percent less than prior years (China Film News, 2021)

Figure 1: Change in Mainland Feature Film Production from 2010 to 2021 (in units) (China Film News, 2021).

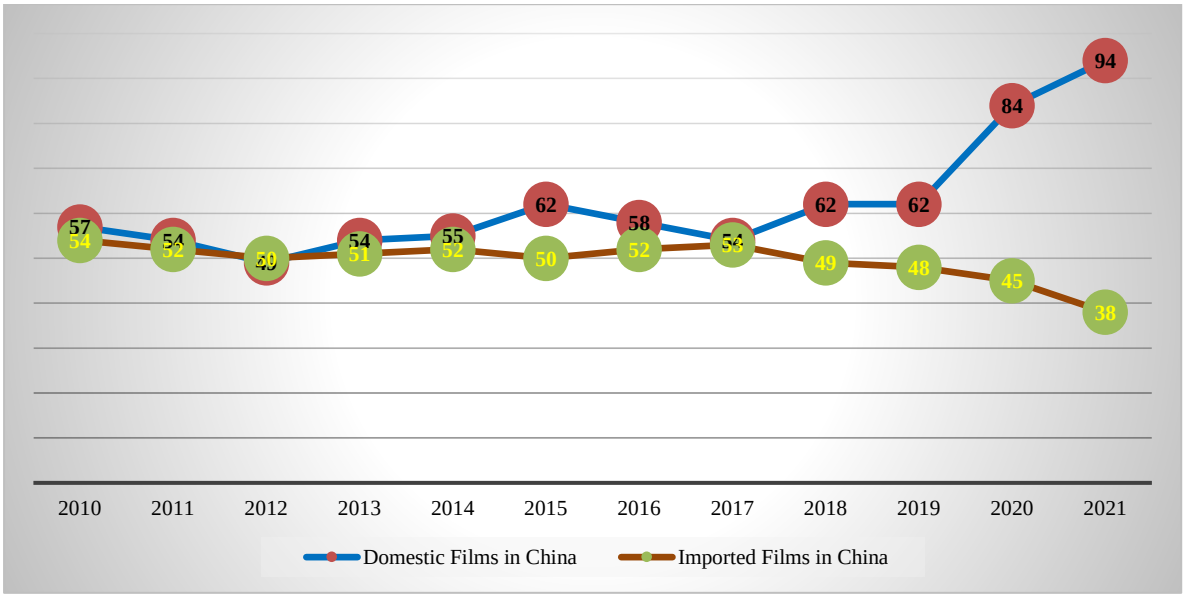


Source: Zhang, Suwannasri & Wang (2023)

Moreover, in 2020, Mainland films made a total of 20.41 billion RMB at the box office or about $3.12 billion. This was 68.17 percent less than 2019. Comscore mentioned that the worldwide box office for 2020 made $12.4 billion, 71% less than the year before. Boxoffice Pro (2021) illustrated that the total North American box office for the year was $2.28 billion, 79% less than the previous year and a record low for North American movies in the past forty years (New Media Center, 2021). China earned more than North America at the box office for the first time and came in the first place worldwide.

There were 280 movies at the theaters. Over 200 of them were made in China, which gave them an 84% market share and 17.15 billion RMB at the box office. Due to a lack of films around the world, fewer films that came from other countries were put out. Only 64 foreign movies were shown, and they made 3.267 billion RMB, which is 16% of the total box office earnings (Figure 2). In the end, the percentage of the market that was made up of domestic films hit a record high in 2020 (Boxoffice Pro, 2021). Additionally, in 2020, 548 million people went to the movies, which was 68.27% less than 2019. The average number of times a person went to the movies in a year was 0.39. The average number of times people in cities went to the movies was 0.65 times per person. During 2020, China watched more movies than any other countries. Because of the pandemic and the rise of new media, both the total number of people who went to the movies and how often they went to the movies went down.

Figure 2: Market Share of Domestic and Imported Films, 2010-2021 in Percentage



Source: Zhang, Suwannasri & Wang (2023)

4.3 China's Cinema Screens

China quickly extended film screens at a brisk rate, adding an average of 19 new screens daily. In 2011, there were 9,000 screens in China, and in 2012 turned into the nation with the highest number of screens (exceeding the U.S.) in 2017, with 45,000 screens. Before the theaters closed amid the COVID-19 pandemic in January 2020, China was projected to have 70,000 screens in above 10,000 cinema theaters, with screening capacity in digital 3D format. Today, China has been recognized as the world's biggest film box office in terms of revenue. Online ticket purchases have heightened competition among the local cinemas. With more than 1.4 billion citizens and a flourishing film industry, China has surpassed the United Sates in film ticket sales for the first time. Movie analysts believe that the Chinese film industry has huge potential to attract more movie-goers if more cinema theaters are opened in the central and western parts of mainland China.

According to China Film News (2021), there were 75,581 screens in 2020 in the mainland Chinese market, a growth of 8.30% from the year before. This was due to the addition of 5,794 screens. Box office receipts were collected from 50 theater chains and 11,856 individual movie theaters around the country (Dengta Movie, 2021). The global screening market has recently become the largest in the world. However, theater management has become increasingly challenging. The average price of a movie ticket in RMB was 37 (Dengta Movie, 2021). The average number of attendees was 9.7, down 3.9% from the previous year (Maoyan Entertainment, 2021). Only 8.1% of the expected people showed up (Dengta Movie, 2021), and the number of people who saw the film on a single screen decreased to 269,000 (a decrease of 70.8%) from what they saw in 2019 (Dengta Movie, 2021). When compared to the rest of the globe, China's film industry's overall figures this year looked impressive. Longitudinal studies, however, also revealed a marked decline in these figures. The unpredictability of the epidemic made it unlikely that the projected numbers for 2020 accurately reflected any objective patterns in the growth of

China's film industry. China's stop-pandemic efforts have helped the industry recover, and the foundations created by nearly two decades of the industrialized reform of the Chinese film industry helped it to survive through the pandemic.

Currently, more and more people are staying at home and watching movies. It is unclear if going to the movies as a cultural tradition will survive the end of the pandemic. 76% of Chinese respondents to the film industry's survey conducted after the COVID-19 outbreak said they would still prefer to watch a movie in a theater because of the special effects (3D) and sound effects. In addition, the improved ambiance and setting attract people to the theatres (Thomala, 2020a, Thomala, 2020b). It is encouraging for the industry that 2020 brought in the best annual box office revenue in history, even though Chinese moviegoers may set a new post-pandemic record high. When asked whether they had watched a movie during the COVID-19 pandemic, 73% of respondents said they used a paid streaming service, and 72% said they would be willing to return to theaters after the pandemic was over. According to the data, over two-thirds (68%) of respondents were interested in learning when local movie theatres would reopen, and over half (55%) were curious about the release dates of upcoming films. Sixty percent of moviegoers surveyed said they expected strict measures from theaters after reopening. In comparison, 58 percent said ticket discounts would be the main reason they would go to the theater again. Forty percent were also interested in the quality of new films. Eighty percent or more of respondents preferred a ticket price of less than 30 Yuan (Maoyan Entertainment, 2020). According to Fu & Shen (2020), the Chinese film business is one of the hardest hit. As theaters in China started to close, reports emerged that as many as 40% of Chinese theaters would have to close because of the COVID-19 outbreak and subsequent lockdown. Due to the current state of affairs, many viewers are turning to online streaming services for their entertainment needs, including viewing Hollywood films that were never shown in theaters (Aftab, 2020). The popularity of online movie streaming services like Netflix, iQiyi, Youku, Tencent, Eros Now, Hulu, Disney Plus, and Amazon Prime Video is a serious threat to the traditional movie-going business model. Another difficulty has been the absence of fresh film releases because of the coronavirus pandemic and its related social limitations (Harper, 2020).

4.4 Post-Pandemic of COVID-19 on the Worldwide Film Industry in China

The global film industry may still be reeling from the effects of COVID-19, but China is busy molding the rest of the world around it. Since the coronavirus emerged, there has been a rapid acceleration in the distribution, exhibition, and viewing of films. The outbreak in China was expected to improve after the film administration decided to keep theaters open after July 2020. When that time came, movie theaters would take the necessary precautions. For instance, moviegoers were to wear masks and refrain from eating and drinking during screenings.

With the recent opening of high-profile theaters, the future of China's film industry appears promising, and the rapid recovery of China's economy will foster substantial global confidence. Confidence in the Chinese economy is rising as more Chinese see that the country's epidemic prevention and control efforts are yielding good results. The rise in China's box office performance is largely due to the government's approval to reopen some

theaters with reduced seating capacities. The new regulations stipulate a 50% limit on indoor seating. Over 5.4 billion RMB ($797 million) at the Chinese box office was from the over 150 million people who have visited theatres since they reopened. It was a huge hit following the recent resurgence of China's film industry. It is encouraging that films made in China have significantly impacted China's box office. The latest rehabilitation rate in China revealed itself at at 88%, and the number of rehabilitated theaters has reached 9,512 (Chan, 2020). By the end of 2020, movie theaters all over the world were once again bustling. Still, China has taken the lead and surpassed North America in becoming the largest film industry while the economies of other countries, including the United States, were still recovering from the effects of COVID-19.

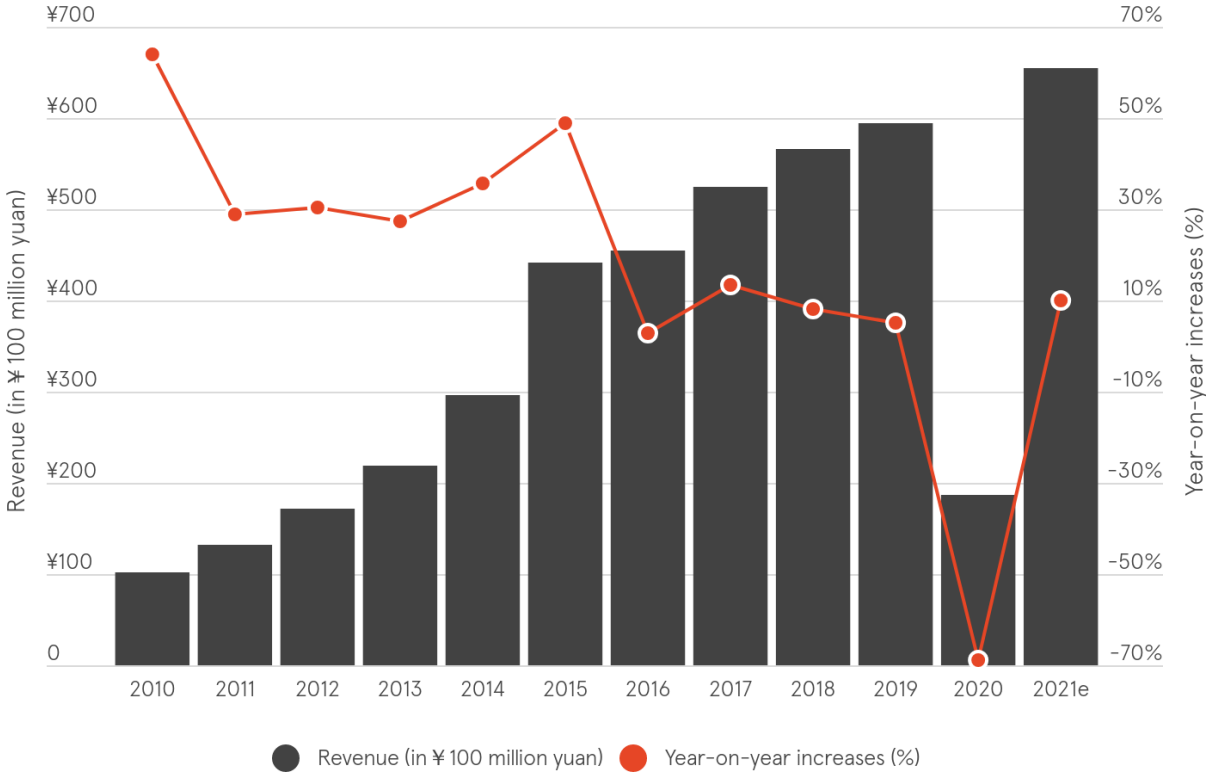
Normalcy has been restored across all of China's major cities now that the coronavirus outbreak has been controlled. Keeping people safe from the camera while filming is challenging enough. However, the coronavirus has made it challenging for several studios to make creative and original decisions in the lead-up to the shoot, including but not limiting casting, set, and costume design. In a similar vein, the same can be said of post-production processes. Many people have a hand in each cycle stage, from initial brainstorming to final distribution. This includes editors and writers to sound designers, foley artists, and colorists. One small scene that undergoes last-minute editing or endorsement changes could have repercussions for every subsequent trailer and film banner version. Until now, many film studios have never agreed on these options while working remotely; however, they now must adhere to new protocols that may alter the content we see onscreen (Epstein, 2020; Jackson & Williams, 2020).

4.5 The Media and Entertainment Sector in China Showing Significant Signs of Recovery

Chinese theaters have been operating at their full capacity since July 2020, while theaters in many other countries were either closed or screening with reduced seating. Yet, any sector felt the effects of a six-month shutdown pretty heavily. The survival of the film industry appeared to depend on "another way out," which in China and around the world typically took a transitional turn from the traditional film format to the digital screen.

It has been widely anticipated in China that the film industry would be "revolutionized," with theaters gradually becoming *relics of the past* (English translation). This has not occurred as of yet. The week of Chinese New Year (the equivalent of a Christmas movie schedule) this year saw the national box office at 7.82 billion yuan (AUD 15.8 billion), a 32.47% increase from 2019, and the most recent comparable year.

Figure 3: China's National Box Office Revenue (2021 Figures Based on Estimates)



Source: Maoyan Entertainment (2021)

In recent years, Chinese films have made a strong comeback, and many factors have contributed to this phenomenon. The researchers' analysis showed details as follows:

1. This uptick in "vengeance-watching"

China's shutdown was strict and certainly one of the longest ever. Residents of Wuhan's residential complexes (often gated communities) were largely barred from venturing outside their homes for 76 days. Theaters and movie theaters in the areas were hit hard in shut-down for caution. Since the virus was somewhat "terminated" thanks to China's "harsh" measures, the country reopened virtually with full and affirmative access, in contrast to the repeated lockdowns seen in other countries. Everyone wanted to break free and go outside. They were confident enough in crowds to visit places like movie theaters. Local outbreaks were quickly controlled and managed in the strict enforcement of provincial health codes, while the rest of the country was largely unaffected. While "limited restrictions" may still be in effect in other countries, they were only temporary in China. As soon as people felt safe again, they flocked back to the venues, quickly filling up local theaters again.

2. The imposed film ban and subsequent accumulation of "film deposit"

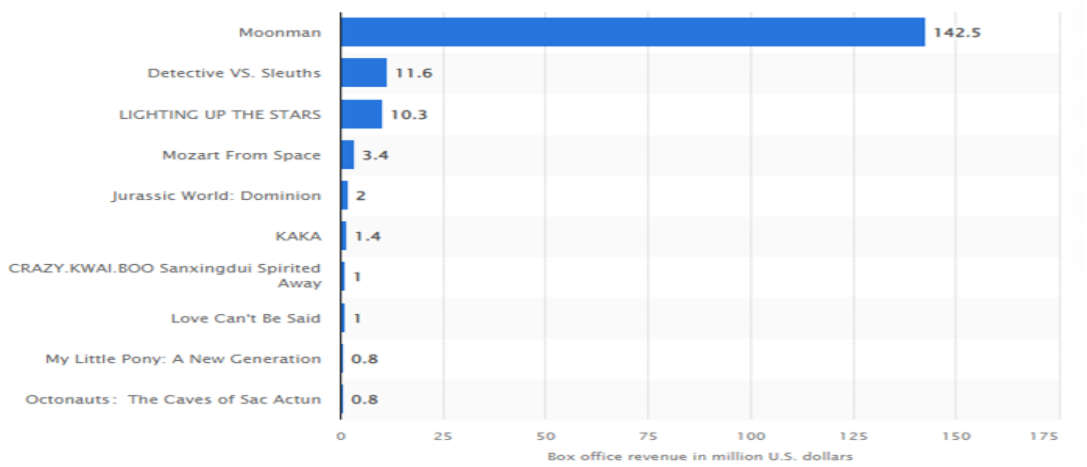
As known, China is not alone in its practice of film censorship. It is only natural that with a film industry cranking out between 600 and 900 new features every year, many movies have to wait their turn before they can be shown. All forms of public video entertainment in China are subject to review by the same censorship body, the China Radio and Television Administration (CRTA). In the absence of a formal rating system, films are subject to strict censorship to ensure they are appropriate for "all audiences." A minimum

of ten critics is required for each film. Understandably, the lengthy time it takes to review and approve films directly results from the large volume of work and the process involved. Frequently, an international audience can watch a Chinese TV series (with uncensored content) via the production company's YouTube Channel before the domestic audience. Production on *Forever Young* began in 2012, but the film did not hit theaters until 2018. The movie theater industry had a backlog of films ready to be shown when the COVID-19 pandemic hit.

3. Home movies with powerful stories

China's film industry has a keen eye for trends and timing, and since theaters resumed operations, there has been a slew of commercial successes. Five ordinary Chinese people from different parts of the country share their experiences in escaping poverty, making a fortune in the big city, or positively impacting their hometowns in the anthology *My People, My Homeland*. Two different families in *A Little Red Flower* dealt with cancer and the ultimate meaning of life and death. In "*Hi, Mom*," the director tells the story of when she and her deceased mother became close as young adults. After a pandemic has claimed many lives, these stories, which are uplifting or deeply moving, are just what the doctor ordered to help people relax again. Meeting their release window was not just the production team's job. The CRTA has also emphasized releasing films like these that reflect the national mood. In *The Eight Hundred*, we learn of the heroic efforts of a small band of Chinese soldiers who stood as the city's last line of defense against the Japanese during a brutal four-day battle. Originally scheduled for release in August 2020, right after the lockdown, it was the perfect soundtrack for a country that had just defeated another enemy. Chinese box office receipts are predicted to rise, but at a slower rate than in previous years due to the effects of COVID-19. Audiences' desire for vengeance in the film may temporarily slow the trend, giving theaters an adrenaline rush. In any case, the trend is clear: the film industry is evolving. That does not mean movie theaters will become extinct any time soon. No matter how much credit you give COVID-19, it is hard to deny that people's tastes are changing. Figure 4 shows the weekly box office revenue of the top movies in China from July 25 to 31, 2022--illustrating the top three weekly movies on the screen in China in July 2022 -- "*Moonman*" had the highest revenue at $142.5 million U.S. dollars, followed by "*Detective VS. Sleuths*" at $11.6 million U.S. dollars, then "*Lighting up the Star*" at $10.3 million U.S. dollars.

Figure 4: Weekly Box Office Revenue of the Leading Movies in China from 25-31 July 2022 (in million U.S. dollars)



Source: Statista (2022)

4.6 Future of Chinese Film Industry

China's control of the COVID-19 over a couple of months with no local cases has given the country a unique opportunity to become the biggest film industry market in the worldwide box office. And since no major new Hollywood movies were set back in 2021, it looks like the U.S. film industry would need time to recuperate in 2020 onward as the globally largest box office. It can be predicted that more than 1.4 billion citizens, globally highest 70,000 screens and a thriving film industry in the Chinese film industry have proved the world's largest market and the biggest global box office in the coming decades (Frater, 2020; Sims, 2020; Whitten, 2020). The post-COVID-19 recommendations and reforms are what the Chinese film industry can learn its lessons from the impact of COVID-19 pandemic and lockdown, which saw billion dollars loss and many people lost their jobs and contracts as the pandemic took a strong hold. Now it is time to learn from the past and adapt a new framework for production under safety protocols and process as the industry as a whole getting back on its feet. In the post-lockdown, now normal is new normal in that the film industry must carry on despite the immense hardship brought by the pandemic.

The researchers have studied the local film industry in China and would like to see the government helps expand the entire industrial chain of Chinese film, from ticket sales to the creation of intellectual property to the use of product placement in films to the creation of theme parks, in order to maximize the industry's financial success. If China wanted to match the U.S. in terms of screen density per person, it would need to add 95,000 new theaters. These steps taken in the wake of COVID-19 have the potential to bring in a more diverse audience and support the Chinese film industry to win its domestic and global box office crown in the years to come.

The government should facilitate the acquisition of licenses for the film industry and investors in a timely and straightforward manner. The Chinese film industry should keep improving the availability and features of online ticketing services. The Chinese film industry also needs to prioritize improving production values in order to compete on a

global scale. Filmmakers, then, who want to secure a solid future, must steadfastly pursue "quality-oriented" strategies.

If theaters really want to attract more viewers, they should start offering screenings for free, particularly in the cinematic environment with larger screens and more realistic sound effects. Movies have a lot of "soft power" and can help a country's reputation abroad. When it comes to influencing others, China has proudly considered itself years ahead of the rest of the world. The Chinese film industry can tell the world more about many other fascinating stories of the country.

The period after COVID-19 would see a paradigm shift, and there will be a great deal to learn from the past. The entire Chinese film industry--investors, producers, directors, and actors--must concentrate on this massive change for the industry to survive. As known to film producers in China, there has not been any success with an authentic multifaceted coproduction. Coproduction needs to start from the ground up if Chinese films are to be appreciated and watched by a global audience, or vice versa. Writing a good script is crucial. There are a lot of talented Chinese screenwriters, but they have a lot to learn from Hollywood in terms of story and international structure.

Chinese moviegoers have their concern over health precaution measures in theaters. The motion picture industry, in the wake of the pandemic, should improve air circulation inside movie theaters. But directors, filmmakers, and artists tend to pay attention to streaming effects on traditional movie theaters. A big-budget movie should always be saved for the theater with good conditions of ventilation and internal air purification for viewers' health. These present challenges to all stakeholders in the movie industry urgently now and beyond.

Drive-in theaters, also known as drive-in cinemas or drive-in complexes, have several advantages over traditional movie theaters, which are located in climate-controlled buildings, in the post-pandemic era of large Chinese cities. The decision to build a drive-in theater large enough to accommodate hundreds of cars was made by the owners of many smaller theaters in rural areas. Then, people should be able to watch movies on their balconies thanks to a mobile cinema that is both innovative and welcoming. The Chinese film industry would benefit from a rise in the median number of domestic film releases, which would boost earnings at the country's multiplexes. In addition, social media platforms like Weibo, Wechat, and Youku can offer significant benefits for filmmakers by allowing them to collect pilot audience feedback before a film's official release. In addition, the film's producer could benefit from allocating more resources for advertising.

The next step is for Chinese filmmakers to take cues from Hollywood and make movies that can be enjoyed by a wide range of people. The movie industry, both internationally and in China, is evolving rapidly, and traditional theaters must now contend with more than just online streaming services. They are rivals for your time and will both have to adjust to the new circumstances. Cinemas across the board, including in China, need to lower ticket prices and provide special discounts to attract customers, in addition to raising the bar on the quality of their latest releases.

Filmmakers may need to make aesthetic and narrative changes, as well as get inventive with their locations and camera techniques. Chinese theaters need a steady stream of new films to draw in customers and keep business afloat. In the future, film editing can

be done from home, and the industry should remove barriers to this practice. China's film industry must also adapt to the changing digital landscape by allowing workers to complete pre-production, post-production, and marketing and promotion tasks from home. Writers and directors in China should attract creative young people into the film industry for sustainable competitive advantages in the international market to increase their market share in the long run.

5. Conclusion

Movie theaters are struggling to stay open. The current situation calls for a dramatic shift in ideology, and venues like streaming services and movie theaters can help make that happen. Theaters and moviegoers in China have been through a "run-in period" since the standard anti-epidemic measures were implemented in 2020. Consumer confidence in the Chinese market is rising as the country's epidemic prevention and control situation improve. Simultaneously, the success of Chinese films at the worldwide box office has emerged out of China's post-COVID-19 period. Up to September 2020, 90 percent of China's movie theatres underwent the process of rehabilitation (Brzeski, 2020).

It should be noted that the Chinese box office revival could be compared with that of its competitor—the United States. However, the U.S. news outlet CNBC asserted that the comparison might not be relevant. The Chinese film industry has considered Hollywood the largest box office worldwide. The United States primarily produces commercial films for profit, but the Chinese film industry has combined patriotism with commercialism as a trend in producing films across various genres. In recent years, filmmakers in China have expressed rising optimism about the future of their country's film industry. There is concern that the coronavirus could make life more challenging for the international film industry, leading to a drop in the number of Hollywood, Bollywood, and other films imported into China. Producers in China need to keep working to restore their country's film industry's standing for a better and brighter future ahead of it.

To the researchers, China's economy has a bright future ahead of it. The world now has much more faith in the global economy with awareness of China's steady economic rebound. China's economic recovery is picking up its speed despite the country's efforts to control the virus, which may help narrow the gap between the Chinese and American economies. The moviegoing public has returned to local theaters, and boosted Chinese films to dominate the box office in recent years. As reported earlier in this paper, the number of moviegoers showed the largest increase in the fourth quarter of 2020. Despite widespread despair resulting from COVID-19, cinemas have consistently proven resilient with unrelenting support from the Chinese public. China would certainly want to see itself as the first country to have a full recovery from the effects of COVID-19 on the local film industry. In so doing, the country would need digital revolution for its growth in the film industry revenue with improved infrastructure and health-based atmosphere of movie theaters. Optimistically speaking, China's film industry would need to venture into cutting-edge genres for success in its production with ultimate goals on winning over both local and international audiences.

6. The Authors

The three authors--Jin Zhang, Isaree Suwannasri, and Lei Wang—are doctoral candidates in the Technology, Education and Management Program, Graduate school of Business and Advanced Technology Management, Assumption University, Thailand. The researchers share their academic and research interest in the areas of entertainment business operations, digital technology application and advancement, and current technical issues and innovations in general/ educational management.

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The Professional Competencies of Art Teachers to Teach Non-art Students in Colleges and Universities in Guangxi Province

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Abstract

The requirement for all students in Chinese colleges and universities to take art subjects before graduation has created concerns as to how to prepare art teachers with proper and effective qualities and professional competencies. The objectives of this research were: (1) to determine the professional competency models of art teachers to teach non-art students in Chinese colleges and universities; (2) to assess the quality of the developed professional competency models; and (3) to evaluate the best fitted professional competency model with empirical data from art teachers. The research used a mixed method with a theoretical framework based on literature review and consultation with five local experts. The respondents were 507 art teachers drawn by using multi-stage random sampling from the population of 3,243 art teachers in colleges and universities in Guangxi Province. The instrument was a questionnaire constructed with specifications on target data to be obtained. The statistics used in the study included descriptive statistics, chi-square test, confirmatory factor analysis, one-factor, multi-factor, second-order-factor and bi-factor analyses, and model comparison, using likelihood ratio test. The research findings revealed that: (1) there were four alternative models for art teachers' professional competencies; (2) except one-factor model, the remaining three models showed acceptable qualities, in terms of both validity and reliability; and (3) the bi-factor model was the best fit model. The bi-factor model composed of a general factor and six specific factors, namely, achievement, affiliation, power, management, cognitive, and personal effectiveness, respectively.

Keywords: *Art teachers, art education for non-art students, professional competency model, colleges and universities in Guangxi Province*

1. Rationale and Background of the Study

Recently, China has positioned art education to maintain and sustain in perception regarding the function of art in Chinese society. Such positioning views art as not only a specialty restricted to artists but also a basic quality for every Chinese citizen who lives in modern society (Boyd, 1999; Zhang, 2020; Wei, 2008). From 2006 to 2020, the Minister of Education of China (MOEC) issued policies on art education or aesthetic education stipulating that students in colleges and universities be required of art course credits for

graduation (MOEC, 2006, 2019, 2020). Educational management in higher educational institutions is specialized by various disciplines, and requires students to be screened for enrolment in various majors by their aptitudes and interests. Provision of a cross-disciplinary course like art education for non-art students therefore poses a challenging demand. To make teaching and learning activities in the classrooms effective, the art education course requires to a great extent that art teachers possess certain capabilities and skills to deal with both academic contents and students' attention and understanding. For art teacher education and training, the key competencies of art teachers to teach non-art students has been a focal concern for all parties involved. The authors of this paper have perceived an urgent need for research into the desired competencies—knowledge and skills—for those art education teachers who are to teach non-art education students in colleges and universities. The Chinese government has also encouraged and supported research on the art education trend to obtain findings as foundations to formulate relevant policy and implementation in this particular discipline. As seen in this paper, the researchers gave brief conceptual backgrounds of the research design and specific theoretical aspects in the sections that follow.

1.1 Art Education for Non-Art Students

Art education for non-art students is primarily art-oriented education open to all students at Chinese colleges and universities (Guo, 2012; Liu, 2012). The differences between art education for professional art students and art education for non-art students are teaching objects (Liu, 2012), teaching contents, and teaching purposes (Xie, 2020). Aesthetic education aims to cultivate learners' abilities to recognize, experience, appreciate and create beauty (Wan & Song, 2020; Xu, 2018; Huang, 2021). Promoted moral level is in fact a profound aim of art education (Meng, 2020). In this study, the researchers put emphasis on the general and special characters of art education for non-art students in Chinese colleges and universities. Effective learning depends on many factors, though teachers are typically expected to be well prepared to motivate and inspire students with various learning abilities and interests. For the case of non-art students learning art education, certain knowledge, skills and pedagogy are specifically required. The researchers needed to collect information on learners' willingness, behaviour, and reflection from current art teachers via a questionnaire on professional competencies. The purpose was to have a good understanding of effective art education for non-art students.

1.2 Competency Theories

The term competency was first proposed by the famous American psychologist David C. McClelland in 1973 (McClelland, 1973) . There were many definitions on competency (Levenson, Stede & Cohen, 2006); Zhong & Shi, 2003). The definition by Spencer and Spencer (1993) was widely used: "competency" as an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation (Spencer & Spencer, 1993) . In this study, the researchers used Spencer's definition of competency as the main reference for elaborating the concepts. According to Spencer & Spencer (1993), there are six types of competencies: achievement,

affiliation, power, management, cognitive, and personal effectiveness, respectively (Spencer & Spencer, 1993).

- The achievement competency is reflected in achievement orientation (ACH), Initiative (INT), concern for order and quality (CO), and information seeking (INFO).
- The affiliation competency is reflected in interpersonal understanding (IU) and customer service orientation (CSO).
- The power competency is reflected in impact and influence (IMP), organization awareness (OA), and relationship building (RB).
- The management competency is reflected in developing others (DEV), directiveness (DIR), teamwork (TW), and team leadership (TL).
- The cognitive competency is reflected in analytical thinking (AT), conceptual thinking (CT), and professional knowledge (EXP).
- The personal effectiveness competency is reflected in self-control (SCT), self-confidence (SCF), flexibility (FLX), and organizational commitment (OC).

1.3 Factor Analysis Models

In this study, four statistical models were used to analyze the obtained data. Of these four models, a comparison was carried out to determine the best-fit model of professional competencies of art teachers for non-art students, as shown below:

1.3.1 One-Factor Model (Single Factor)

This model was based on Alfred Binet's intelligence theory **(**Binet & Simon, 1997). The one-factor model was a confirmatory factor analysis (CFA) model corresponding to the total score method. It took the whole construct as factors (latent variables) and all topics as observation indicators. As the only factor, general competency (overall construct) was directly defined on 20 observation indicators. In this study, the researchers hypothesized the art teacher's competency as the one-factor model among the four alternative models.

1.3.2 Multiple-Factor Model

The multi-factor model was based on the theory of E. L. Thorndike (1927), who believed that there was nothing like General Ability and each mental activity required an aggregate of different sets of abilities. The multiple-factor model was a CFA model corresponding to the component reporting method. It took each dimension as a factor, the corresponding topic as an observation indicator, and used factor correlation to reflect the covariance between dimensions. Therefore, the model was also called "correlation trait model." Like the component reporting method, although the model could test the unique effects of each dimension, it could not analyze the common effects between dimensions. In this study, the researchers hypothesized the art teacher's competency as the 6-factor model among the four alternative models.

1.3.3 Second-order model

The second-order factor model assumed that each first-order factor was directly affected by two factors at the same time; one was the second-order factor representing general competency ("g" factor), explaining the common variation between dimensions; the other was the residual of the first-order factor, explaining the special variation of each dimension. In this study, the researchers hypothesized the art teacher's competency as the

second-order factor model among the four alternative models, which consisted of art teacher's competency--general competency as a primary factor, and the other six hierarchical factors (Thorndike, 1927; Cortina, 1993; Hu, 1999).

1.3.4 Bi-factor model

The last alternative model, the researchers hypothesized the art teacher's competency as comprising 2 types of factors--the first was the g-factor which held that an underlying factor of general-art-teacher competency existed and formed the foundation out of all intellectual abilities; and the second was the s-factor or the specific factors. In a bi-factor model, a general factor and multiple group factors (or domain-specific factors) competed to explain the variance of the indicators, and no factor was higher than the other. In this study, the researcher hypothesized the art teachers' competencies as categorized into the bi-factor mode--holding general-art-teacher competencies and special competencies (Thorndike, 1927; Cortina, 1993; Hu, 1999).

2. Research Objectives

In this study, there were three main objectives:

1) To determine the professional competency models of art teachers to teach non-art students in Chinese colleges and universities.

2) To assess the quality of the developed professional competency models of art teachers to teach non-art students in colleges and universities.

3) To evaluate the best fitted professional competency model with empirical data from art teachers.

3. Research Methodology

3.1. Population and Samples

The population in this research was art teachers teaching art courses to non-art students in 38 colleges and universities in Guangxi Province, totalling of 3,243 persons. The Optimal Design Software was used to calculate the sample size, indicating that the sample size of at least 500 was acceptable. To guarantee the minimum, the researchers sent out 520 questionnaires and the actual return was 507, or 98 percent.

3.2. Instruments and Data Analysis

A Likert-type self-rating questionnaire, consisting of six detailed parts was used to collect data on Achievement, Affiliation, Power, Management, Cognitive, and Personal Effectiveness, respectively (Likert, 1932). The Item-Objective Congruence (IOC) was used to evaluate the validity of the questionnaire by five local experts. The items with IOC scores lower than 0.8 were revised. The final draft of the questionnaire consisted of 67 items, which were further used for a reliability try-out. Based on Cortina's criteria (1993), the Cronbach's alpha coefficient for the final questionnaire of 65 items was 0.983. The computer software, SPSS, was used for descriptive statistics and AMOS for hypothesis testing and model evaluation.

4. Research Results

4.1. Demographic Characteristics

Of 507 respondents, 59 percent was male, in contrast to 41 percent female, with no obvious indication of gender bias. The majority (73.2%) of the respondents were between 31-55 years old, followed by 19.5 percent in their 30s or below, and the remaining 7.3 percent over 55. Most respondents (67.75%) were holding graduate degrees, with 67.8 percent Master's, 24.1 percent doctoral, and the remaining 8.3 percent with Bachelor's degrees. As for work experience, most of the respondents (78.7%) were in the range between 6 to 15 years, and about 10 percent in the ranges of less than 6 years and more than 16 years. Most of the respondents were holding lecturer titles (37.9%), associate professors (47.7%), professors (12.8%) and assistant professors (1.6%), respectively.

4.2. Analysis of the Models

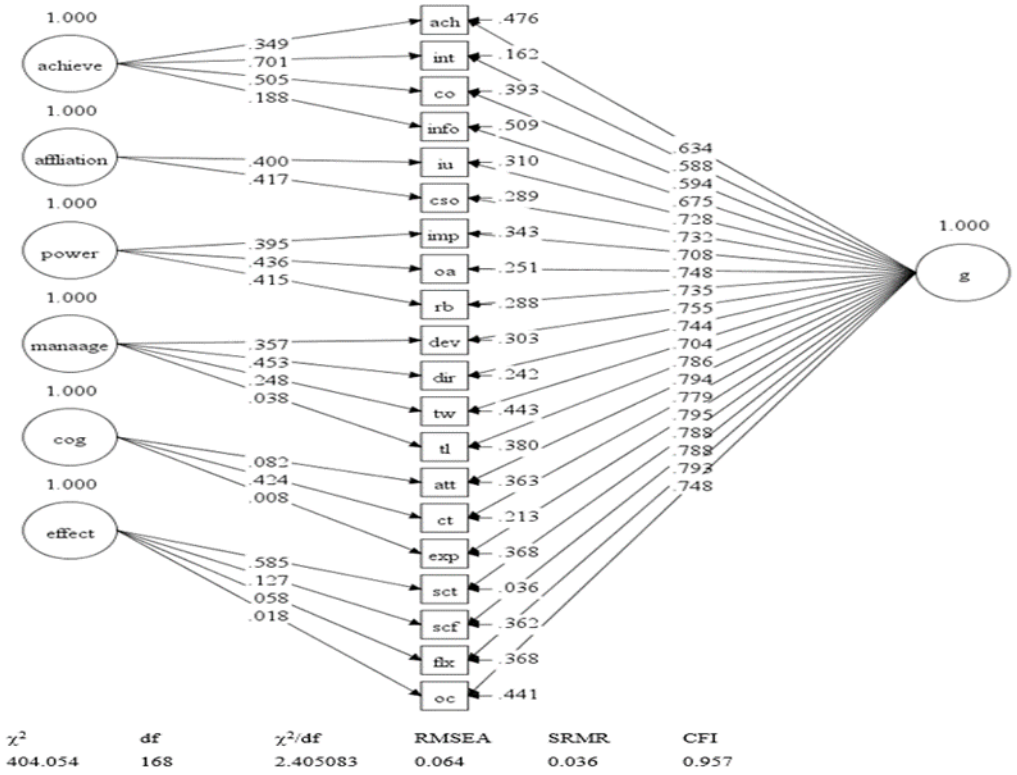
The four alternative models were tested by using chi-square tests, confirmatory factor analysis and an AMOS computer software, and each model revealed certain peculiarities. In the one-factor model (chi-square value=903.522; df=170; ratio value=5.3148; CFI=0.859; RMSEA=0.112; and SRMR=0.053), the overall analysis indicated the measurement model was acceptable (Hu & Bentler, 1999). Though the indicators showed that all 20 factor loadings were statistically significant, ranging from .622 to .794, and the coefficient of determination (R^2) ranges from .387 to .630, the interpretation was that all indicators could be used to measure art teachers' competencies as one general factor at a moderate level. It appeared that one-factor model might not be suitable to access the competencies of art teachers for non-art students in colleges and universities.

In the multiple-factor model, the statistics (chi-square value=527.186; df=155; ratio value=3.401; RMSEA=0.083; SRMR=0.042) showed that it was acceptable (Hu & Bentler, 1999), and the CFI value was 0.982, indicating the model fitted well. The multiple-factor model was good for accessing the competencies of art teachers for non-art students in colleges and universities in Guangxi province. All of these factors were statistically significant with loadings more than 0.50 in standardized scores. The composite reliability (CR) of all factors was over .70, which met the cutting point (Hu & Bentler, 1999) and the means all factors at an acceptable reliability.

In the second-factor model, the statistics (chi-square value was 597.758; df=164; ratio value=3.6449; RMSEA=0.088; SRMR=0.047), showed that it was acceptable (Hu & Bentler, 1999), and the CFI value was 0.916, indicating that the model fitted well. All of the indicators had significant factor loading values more than .70, which indicated that they were good indicators (Hair et al., 2017) for measuring the professional competencies of art teachers for non-art students in colleges and universities in Guangxi Province.

The bi-factor model analysis, shown in a graphical model in Figure 1, with the key statistics (chi-square value=404.054; df=168; ratio value=2.4051; RMSEA=0.064; SRMR=0.036), indicating that it was acceptable (Hu & Bentler, 1999). The CFI value was 0.957, also indicating that the model fitted well. The bi-factor model was good for accessing the competencies of art teachers for non-art students in colleges and universities.

Figure 1: Bi-factor Model in Standardized Mode



In addition, Table 1 shows the estimated factors loadings of general factors and specific factors of the bi-factor model of art teachers' competencies in Guangxi Province. The general factor revealed the factor loadings of more than 0.50, which were statistically significant and showed the convergent validity (Hair et al., 2017), and the omega hierarchical reliability at 0.939, which was at a high level.

4.3. Reliability of Bi-Factor Model

Cronbach's alpha coefficient has been recognized as a popular method to evaluate the reliability of the scale. However, measurement specialists have reiterated the limitations of coefficient alpha and demonstrated that its assumptions were likely to be violated in practice, and provided alternatives that were not dependent on such unrealistic assumptions. The omega coefficient gradually replaced the Cronbach's alpha coefficient (Peters, 2014) .

The omega hierarchical (ω_h) represents the proportion of variance of the total scores explained by the single general factor in the bi-factor. The ωh value based on the data obtained in this study was 0.939, meaning 94% of the variance generated by general competencies.

The omega hierarchical subscale coefficients (ω_s) can also be calculated for each subscale that provides an estimate of subscale reliability, controlling the general factor (Peters, 2014). Based on the bi-factor model data, the omega hierarchical subscale coefficients value on achievement was 0.008, on affiliation at 0.004, on power at 0.005, on management at 0.005, on cognition at 0.001, and on personal effectiveness at 0.003,

respectively. Relative to the general factors, the reliability of each special factor (ω_s) was low.

The Explained Common Variance (ECV) estimates the proportion of the common variance in the bi-factor model attributable to the single general factor, and thus it is considered an indicator of uni-dimensionality. A high ECV indicates that the obtained data have a strong general factor compared to group factors. In this study, the ECV value was 0.969, the deviation of parameter estimates (such as general factor loading and path coefficient) generated by fitting the multidimensional test data with a one-dimensional model was small but acceptable. The high ω_h and high ECV of the general factors indicated the reliability and high intensity of the identified general competencies.

Table 1: Factor Loadings in Standardized Mode and R2 of Bi-Factor Model

Indicators	Fcators							
	general	achieve	affiliation	power	manage	cog	effect	R^2
ach	0.636**	0.346**						0.524
int	0.589**	0.701**						0.838
co	0.595**	0.503**						0.607
info	0.674**	0.188**						0.490
iu	0.728**		0.401					0.691
cso	0.732**		0.416					0.710
imp	0.709**			0.392**				0.657
oa	0.751**			0.430**				0.749
rb	0.738**			0.409**				0.712
dev	0.765**				0.254**			0.650
dir	0.744**				0.497**			0.800
tw	0.706**				0.227**			0.550
tl	0.77**				0.132**			0.610
att	0.791**					0.159		0.651
ct	0.782**					0.079		0.617
exp	0.795**					0.08		0.638
sct	0.796**						0.231**	0.687
scf	0.79**						0.138	0.644
flx	0.791**						0.115**	0.640
oc	0.743**						0.107**	0.564
Σ	14.625	1.738	0.817	1.231	1.11	0.318	0.591	
ω_h =	0.939							
ω_s =		0.008	0.004	0.005	0.005	0.001	0.003	

Note: ** = p<.01, ω_h = Omega hierarchical coefficients, ω_s = Omega hierarchical subscale coefficients

4.4. Comparison of Fitting Indexes of Models

Table 2 shows the indicator values on the models fit among the four alternative models. Comparatively, the chi-square value of the bi-factor model was the least among the four models, with the value of 518.059. On the RMSEA values, the bi-factor model showed the least values of 0.082, while the RSMR values, the bi-factor model shared the least value of 0.04 with the one factor model. On the CFI values, where the criterion suggests the highest value is the most desirable, the bi-factor model also showed the highest value of 0.93. Thus, it could be taken that the bi-factor model was the most suitable model in explaining the professional competencies of art teachers for non-art students in colleges and universities in Guangxi Province.

Table 2: Summary of Fit Statistics for Alternative Models

Alternative Models	χ^2	df	χ^2/df	RMSEA	SRMR	CFI
1.Onefactor	903.522	170	5.314835294	0.112	0.04	0.859
2.multifactor	527.186	155	3.4012	0.083	0.042	0.928
3.2ndorder	597.758	164	3.644865854	0.088	0.047	0.916
4.Bifactor	518.059	155	3.342316129	0.082	0.04	0.93

5. Discussion

This study revealed that the bi-factor model was the most suitable model in evaluating art teachers' professional competencies for non-art students in colleges and universities. As for the achievement competency, to comply with the government policies, art teachers should understand well the goals of art education for non-art students in colleges and universities as well as other related information. The finding from this study was consistent with the study carried out by Kong (2012).

The affiliation competency suggested that art education for non-art students be different from art major students; therefore, art teachers should pay attention to their specialty as adjusted to those students with no basics in art. They may be able to understand the art knowledge, but they may not be able to master the art skills as quickly as art major students. Art teachers need to understand the situation of non-art students (Xu, 2018). Further, art teachers need art professional competencies to teach non-art students, and help them to attain the identified goals of art education for non-art students (Tang, 2021; Wan & Song, 2020).

As for the power competency, art classroom can be considered as a temporary organization. In this organization, an art teacher has power to play a critical role to organize efficient teaching and learning activities. In the practice of school education by controlling teachers' power, building dialogue relationships, cultivating learning communities, and balancing the relationship between power and non-power, the teachers can give full play to the role of teachers' influence (Sun & Sun, 2020). As for art teachers, the power competency mainly acts as general competency in creating good products or lessons as well as delivering quality services or teaching (Sukiam & Likitsarun, 2021).

The management competency also acts as general competency, especially in a company, factory, or other organizations with definite goals. Some researchers suggest that classroom management of colleges and universities, based on the humanistic management theory, has the characteristics of scientific, humanistic, and innovative dimensions (Jin, 2022). In the area of art education for non-art students, such as painting, it is only embodied that art teachers direct the students to draw and finish the painting work.

The cognitive competency acted as part of the competencies of teachers. Sun (2012) asserted that teachers' cognitive ability was the basic condition in improving teachers' professional quality in teaching, optimizing teaching effects, and realizing educational and teaching goals. As for art education, getting a good cognition on concepts of art, education, innovation and authentic assessment of the target learning outcomes (Petchroj, 2022) will

help promote the teaching quality in attaining the goals of art education for non-art students in colleges and universities.

As for the personal effectiveness competency, teaching and educating are the basic work content for teachers. Students not only gain knowledge from teachers, but also get good quality training from their teachers. Undoubtedly, the influence of teachers' good character on students is vitally important. A teacher's character is an irreplaceable educational factor, and it will have a profound impact on students' life.

6. Conclusion and Recommendations

6.1. Conclusion

This study aimed to identify the professional competency model of art teachers for non-art students in Guangxi Province, using four alternative factor analysis models and competency classification from Spencer's competency dictionary. Through the factor analysis and comparison of the models, it was found that except one-factor model, the remaining three models were statistically acceptable. Comparatively, the bi-factor model was the best fit professional model, which showed the best values on the chi-square test, RMSEA, SRMR, and CFI. The model contained two main factors--general and specific competencies, with six sub-dimensions: achievement, affiliation, power, management, cognition, and personal effectiveness competency.

6.2. Recommendations

Based on the research findings, the researchers would like to suggest that the policymakers should focus on both art teachers' general and specific competencies, as requirements for recruited art teachers to teach non-art students. Art teachers should have profound professional knowledge to be able to cultivate and strengthen students' artistic literacy, aesthetic ability, and innovative and broad perspective toward work. The policymakers should also pay attention to the ideological quality of art teachers as ethical educators to help strengthen self-education in learners. In this regard, colleges and universities need to focus on the innovative concept of education and awareness of the country's reform on public art courses at the higher education level.

The researchers also would like to see that art teachers be sensitive to the difference between profession art education and art education for non-art students. Instead of emphasizing the teaching and training of art skills and the indoctrination of art knowledge, art teachers should aim at artistic innovation created by their non-art students. Taking innovation as a major aspect of public art education, teachers will work on innovative teaching content and pedagogy in support of students' ability to innovate in public art, particularly in line with current developments in the art discipline.

6.3. Limitations of the Study and Further Research

The researchers were aware of the limitation in selecting the participating subjects under study in that they were confined to colleges and universities in Guangxi Province. The results and conclusion were not generalized to other educational contexts in China. More diversified subjects should be included in further study to make a comprehensive

picture of the competencies required of art teachers for non-art students. Moreover, this research obtained perception data from the participating art teachers; it would be more convincing to secure empirical data via interview and group discussion to shed light on clear-cut and effective competencies required of art teachers to work with non-art students at colleges and universities in China as well as in similar educational contexts.

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Management Model for Environmentally Friendly Business Operations of Industrial Factories in Nakhon Ratchasima Province

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Abstract

This research was to (1) study the demographic information of executives and company profiles, (2) identify the levels of Industrial Factories Management, Embeddedness of Corporate Social Responsibility Culture, Corporate Innovation, Green Corporate Image, and Firm Performance, and (3) examine the factors of Corporate Innovation and the Green Corporate Image--both qualified as intermediary factors that connect Industrial Factories Management and the deepening of Embeddedness of Corporate Social Responsibility Culture to the Firm Performance. The sample group was the executives of medium and large industrial plants, located in the area of Nakhon Ratchasima Province--200 per group by two-stage sampling method and simplified sampling to re-examine the causal model using AMOS program. The results showed that all factors were averaged at a high level. The analyzed model included executives of medium and large industrial plants located in the area of Nakhon Ratchasima Province with a harmony index of x^2 /df = 1.716, RMSEA = 0.045, RMR = 0.015, for the influence curve of all factors affecting the management potential of environmentally friendly business operations of industrial factories in Nakhon Ratchasima Province. The findings pointed to the executives of medium and large industrial factories located in the area of Nakhon Ratchasima Province being able to manage business operations that are environmentally friendly for industrial factories.

Keywords: *Industrial factories management, embeddedness of corporate social responsibility culture, corporate innovation, green corporate image, firm performance, Nakhon Ratchasima Province*

1. Introduction and Rationale of the Study

Industry plays an important role in enhancing the economic well-being of people worldwide. It serves as the main factor contributing to the production of goods, employment and the stimulation of technology and innovation for society at large. However, traditional industrial production processes have had a negative impact on the environment, including the health of humans and animals. The United Nations therefore raised the issue of industrial improvement to achieve sustainability by 2036, with a focus on increased efficiency in utilizing resources and technology in cleaner and more environmentally friendly industrial processes (Zameer et al., 2020). The Thai government, through the Ministry of Industry,

began to take the concept of sustainable industrial development as part of its defined guidelines for industrial development in Thailand, to make production environmentally friendly through the Green Industry Project in 2011, which is still in operation. The green project as such has provided assistance and encouraged development in improving the management of environment, safety and energy saving plans (OECD, 2005; Albino et al., 2012; Bathmanathan & Hironaka, 2016).

Environmentally friendly industry or green industry involves the management of factories or industries that utilize resources efficiently, ensure efficient waste recovery in the production process, and prevent pollution by using clean technology for the production of environmentally friendly products (Eco Products). Waste becomes raw materials for other factories (Industrial Symbiosis), emphasizing waste and waste recycling according to the 3R's "Reuse, Reduce, Recycle" principle, i.e., waste reuse, reduction, and utilization of waste/waste materials. The new green industry must have a complete internal and external environmental management system--be it a waste or pollution management system, energy management system, or a set of environmental protection activities within the organization (Aivazidou et al., 2018).

Culture building and industrial networking are considered the highest objectives of the green industry for industrial factories in Nakhon Ratchasima Province because the province appears to have a high potential and can get ready in all the major aspects of the country's economic structure, particularly in the industrial/ agricultural sector and wholesale and retail trade. The operating industrial plants have faced problems in achieving environmentally friendly production to continue their business operations. Those companies that lack competence in adapting to environmentally friendly production, or withstanding the pressure of changing market competitive conditions in environmentally friendly production. Considering those major factors and problems in the business operations of the abovementioned industrial plants, the researchers were able to perceive both opportunities and obstacles facing industrial factories in Thailand that need to change their production processes. Their business operations based on environmentally friendly production or green industry for pollution prevention, appropriate waste treatment, low energy consumption, reuse, recycling, and the use of substitute products. Energy optimization in the industry according to international standards, water conservation, preventing future pollution, service for green production, and environmental surveillance networks, fundamentally creates participation from all parties in the care and conservation of the country's resources and environment--leading to the green industry for sustainable development (Aivazidou et al., 2018; Zameer et al., 2020).

2. Research Objectives

The research had three objectives:

1. To study the demographic information of executives and company profiles.

2. To identify the levels of Industrial Factories Management, Embeddedness of Corporate Social Responsibility Culture, Corporate Innovation, Green Corporate Image and Firm Performance.

3. To examine the factors Corporate Innovation and Green Corporate Image as intermediary factors linking Industrial Factories Management and the deepening of Embeddedness of Corporate Social Responsibility Culture to Firm Performance.

3. Research Hypotheses

There were six research hypotheses under study:

1. Industrial Factories Management has a positive influence on Corporate Innovation and Green Corporate Image.
2. The deepening of the Embeddedness of Corporate Social Responsibility Culture has a positive influence on Corporate Innovation and Green Corporate Image.
3. Corporate Innovation has a positive influence on Firm Performance.
4. Green Corporate Image have a positive influence on Firm Performance.
5. Corporate Innovation and Green Corporate Image are the intermediary factors between Industrial Factories Management and Firm Performance.
6. Corporate Innovation and Green Corporate Image are the intermediary factors between the deepening of Embeddedness of Corporate Social Responsibility Culture and Firm Performance.

4. Scope of Research

The researchers confined this study to a management model for environmentally friendly business operations of selected industrial plants in Nakhon Ratchasima Province. The scope of research covered Industrial Factories Management, Corporate Innovation, Embeddedness of Corporate Social Responsibility Culture, Green Corporate Image and Firm Performance in terms of population, executives of medium and large industrial factories located in the area of Nakhon Ratchasima Province with a total of participating 400 industrial factories in April 2021.

5. Terminology in the Study

Industrial Factories refer to the economic production of goods, including materials or services. They are places for producing economic goods, where workers process the products themselves or with the help of machines. Such places consist of several buildings filled with machines where workers produce things or operate machines that process product items (Zameer et al., 2020).

Environmentally Friendly Industry refers to the internal and external environmental management system, whether it is a waste and pollution management system, an energy management system, or environmental protection activity within the organization (Ormazabal & Sarriegi, 2013). Buildings and industrial networking are vitally important in supporting packaging, product design, concept of the package design used in transporting products from manufacturers to designated consumers-- preferably sourced and crafted from local natural materials that are environmentally friendly.

Industrial Factories Management refers to the planning in the manufacturing industry for good operations. It focuses on creating a new standard for the factory, and using the created standards to link production data with reduced inventory costs (Tucker,

2021). An allocated factory system enables efficient production control and planning--making it easier for factory management to help executives gain access to an overview of the company's financial and operating conditions, which in turn affects the decisions made on business operations (Albino et al., 2012).

Embeddedness of Corporate Social Responsibility Culture means a practice that is accepted and followed by personnel in the organization. Organizational culture influences the attitudes and behaviors of the members of the organization. It also includes knowledge, understanding (cognition) and values in the organization which arise from members of the organization, and will affect the ideas, beliefs and practices of social norms in the organization (Zameer et al., 2020).

Corporate Innovation refers to an organization that has improved and changed its thought processes to create something new, different and useful, from the existing or previous behavior (McKeown, 2008). Whether in the product itself, the production process, the service model, the way the product is delivered to the consumer as well as the management model, operation, system and activities are applied to become a method of practice for the general public (Gibbons, 1997; OECD, 2005).

Green Supply Chain Management (*Green Corporate Image*) refers to the process of collecting planning and management before the production of the product, and even bringing products to consumers for maximum satisfaction by various activities in the flow of raw materials, procurement, production, storage, and technological application. Distribution freight which links all processes together with standards creates added value for products and services so that consumers are impressed with products and services (McKeown, 2008).

Firm Performance refers to the ability of the organization to use the resources available to produce products with efficiency, effectiveness, meeting standards, and achieving low cost. All these can be achieved by planning and the organization's profit target within the scope of the objectives set for the maximum efficiency of an organization (Tucker, 2021).

6. Related Literature

6.1 Factory System

A factory system has components of personnel, machinery and the system that works behind the scenes. According to Geffen & Rothenberg (2000), setting up a quality factory system has the following benefits: (1) Creating a new standard for the factory links the created standards with production data. This directly results in good management planning and quick business decision-making--saving time in operations. Moreover, this information can be used to increase quality or reduce additional production costs. (2) Reducing inventory costs helps the allocated factory system to control and plan production efficiently. The result is that the management of raw material allocation in both purchasing and planning better can reduce inventory problems and help manage warehouses more systematically. (3) Efficient factory management helps executives gain an overview of the company's financial and operating conditions, which affects decision-making in business operations (Lucato, Vieira & Santos, 2013).

6.2 International Standard Industrial Classification of All Economic Activities

International Standard Industrial Classification of All Economic Activities, abbreviated as ISIC, is a standard established by the United Nations. CE (Conformite Europeene) mark means that the goods conform with European standards. ISO, International Standards Organization, is an international organization on the subject of standardization; the main goal of ISO is to help promote the production of international standards including various related activities. This will lead to better industrial and economic development, especially ISO 14000 as a standard system involving environmental management systems. Emphasis is placed on the organization of continual environmental development for industrial standards in Thailand. Thai Industrial Standards Institute (TISI) has adopted the ISO international serial quality system to improve quality in organizational management. ISO standards are crucial for practitioners to have clear guidelines for them; however, ISO standards require time and funds to implement (Colmenero, Paramio & Garcia, 2019).

6.3 Embeddedness of Corporate Social Responsibility Culture

Embeddedness of Corporate Social Responsibility Culture is relevant to all stakeholders in society; for example, the main labor group within the organization, and community groups in the community in which the business is located. The matter of concern rests upon how to treat the labor sector in the management of the organization's resources in terms of money, tools and equipment to support the work, and in terms of knowledge. There will be management of different knowledge requirements of workers at each level, such as hill tribe people, villagers and executives who have different potential to benefit (Leverage Workforce Management). This increases productivity and reduces production cost resulting in a return as a financial value (Financial Value), influencing the value of the environment (Environmental Value), together with social value (Social Value) management of workers in different groups with varying ideas, different educational and religious backgrounds--resulting in divisions of management. Social responsibility is divided into two parts: (1) multiplying labor management (Leverage Workforce Management) (2) creating awareness of environmental awareness (Environmental Awareness Consciousness) (Zameer et al., 2020;Tucker, 2021).

6.4 Corporate Innovation

Corporate innovation improves and changes an organization’s thought processes to create something new and different from the former things that exist or have been practiced--be it the product itself, the production process, the service model, the way the product is delivered to the consumer, management model, operation, system or activities (OECD, 2005; Ratchavieng, Srinet & Syers, 2021). Corporate innovation has been widely attempted and become a method of practice for the general public (Gibbons, 1997).

Innovation can help increase the competitiveness of an organization--from the invention of new products, new services, or new processes--to meet the needs of customers. In addition, production innovation increases efficiency in the production process to be flexible, save time, reduce unnecessary production steps, and increase the production volume. Higher efficiency results with lower production costs from bringing in innovation

can help reduce production errors and improve the accuracy of the manufacturing process. Providing quality products through acceptance from customers or users leads to customer satisfaction, loyalty, and profit from higher sales. Creation of organizational innovation accounts for the success and competence of the organization. Innovation can be divided into four types by utilization purposes, namely (1) product innovation. This is the development and introduction of new products, whether through technology, including improving existing products for better quality and performance (Smith, McKeen & Singh, 2006). (2) Service innovation. It brings ideas into operations or uses new technologies to meet the needs and then creates satisfaction for customers. This will also enhance service efficiency and create added value for businesses. (3) Manufacturing innovations. The manufacturing company that has developed superior performance compared to competitors brings new knowledge to be applied in the production process for efficiency, flexibility, and cost effectiveness (Zhou & George, 2001; Vander et al., 2010). Innovation is a matter of change in the organization whether it is the tool, production process, distribution, or organization management model (Sriboonnark, 2020). The goal is to deliver innovative products to consumers or users for their satisfaction with and loyalty to the organization (Matsuo & Kusumi, 2002). Management that responds to modern operations requires new work systems or new ways of working, including new combinations of work in creating new things useful to the management team—even to the extent of virtual management.

6.5 Green Corporate Image

Green Corporate Image involves the concepts, beliefs and impressions about the organization's environmental activities that yield environmentally friendly products or services for customers (Kotler & Keller, 2006; Zameer et al., 2020). The goal rests upon sustainability through corporate social responsibility practices. It usually uses a business model that assesses the impact of actions on social considerations and being environmentally friendly for the positive vision of the organization.

Green Corporate Image taps on the internal processes of consumers, or conceptual elements resulting from the assessment of the benefit to consumers, and about the benefits of green products that prompt emotional response from existing and potential consumers. The benefits of green brands bring about consumer loyalty to the organization with its support for environmental protection (Shahid et al., 2020). It also sets an organization apart from its competitors as the first choice when consumers consider purchasing a product. Consumers with strong beliefs in the environmental friendliness of products are more likely to purchase them than competing products especially in industries with high negative external factors (Zameer et al., 2020). As a result, a good image will affect financial performance (Aivazidou et al., 2018). Green activities are worthwhile for organizations only if they are adequately promoted for consumers' awareness of the company's environmental friendliness--followed by their purchase intention. Therefore, companies should build a green image in order to create a better image in the minds of potential customers (Xie et al., 2019). A sustainable green enterprise must take social responsibility into account, both internal responsibility for risk management preparation, quality enhancement, cost reduction, waste reduction, and business-related laws. External responsibilities for environmentally friendly procurement are meant to meet customer needs for innovation (Brand Image) and

for environmentally-friendly products (Green Products). The use of resources with environmental considerations by the management of the green supply chain (Green Supply Chain Management) is initially linked from the procurement to the green supplier. This encourages suppliers to adopt environmental practices and focus on environmentally friendly raw materials. Green organizations can reduce costs, increase profits, use resources cost-effectively, and reduce environmental impact, health and safety risks. CSR is a permanent pattern of business activities intended to be followed and exceeds legal and corporate expectations for the safety and health of employees as well as improving their well-being. CSR contributes to the well-being of corporate society with ethics, morality and environmental standards, reduced use of resources in the organization, and increased energy efficiency in the production process as well as operations.

6.6 Firm Performance

The organization's ability to perform on the resources available to produce products with efficiency is to meet standards at low cost, and plan for business goals on success in the operation within the scope of the objectives set for maximum efficiency of the organization.

Firm Performance depends on effective business analyses, and the implementation of strategies to obtain results from the process that the organization has carried out. With different business organizations giving their perspectives on their specific differences in performance to be attained. The final stage of organization occurs as a result of external factors covering three areas: (1) *financial performance*, such as profit, return on investment, and return on assets, (2) *financial performance of marketing*, such as sales and market share, and (3) *the performance of returns for stakeholders or shareholders*, such as total return and economic value (Richard et al., 2009). The end result will be from the production process and comprehensive administration, and both quantity and quality can be assessed and compared to goals or objectives based on historical or comparative performance standards or compared with other organizations according to the objectives set (Ondategui et al., 2004). Assessment of the organization's performance will be the aggregate result in the process, the final result of an activity, or the sum total of the final results of the activities in all processes and all activities of the organization (Gibson et al., 2011), with inputs, outputs, transformation (Transformation) and feedback (Feedback Effects). As for asset management, an organization needs to add value to products and services, build a reputation for the organization, and develop organizational knowledge to create relationships to achieve goals. Organizational goals and the performance indicators of the organization have two dimensions. *Productivity* starts from looking at productivity and production values in terms of performance efficiency and profitability. An organization also requires an outline of a *comprehensive assessment* of profit and productivity for the overall operations.

7. Research Methodology

Quantitative Research in Causal Model Examination used data obtained from the questionnaire. The structural equation from latent factors includes Industrial Factories Management and the deepening of Embeddedness of Corporate Social Responsibility

Culture. The intermediary factor consists of the Corporate Innovation factor and Green Corporate Image--leading to the Firm Performance factor.

7.1 Research Data

The researchers used theory and research as primary data and a basis for constructing appropriate tools for data collection, herein a questionnaire for the respondents. The secondary data were from related research papers, research theories, and academic work obtained from documents, books, articles, or other relevant sources in the past. The documents used in this research were from Thailand and international sources to secure the concepts, theories and principles of management models in environmentally friendly business operations of industrial factories as pertinent to the industrial context of Nakhon Ratchasima Province.

7.2 Population and Sampling Plans

The population used in this quantitative research study included executives of medium and large industrial factories located in the area of Nakhon Ratchasima Province. The sample size was based on the model and therefore relied on minimum values guaranteed to test structural equations using the principle of Cohen (1988) and Westland (2010), and determine the power of test at 0.80, significance level 0.05. This study identified 5 latent variables and 12 empirical variables. The results were calculated with n sample size steps. The minimum was 150 samples. This research used a sample size of 400 units from the population which should guarantee the ability in testing structural equations according to the principle used by Cohen (1988) and Westland's (2010).

7.3 Population Scheme

Two-stage sampling was carried out with the following sampling plan: (1) Executives of medium-sized industrial factories located in the area of Nakhon Ratchasima Province: area entrepreneurs in Muangmai Suranaree, Muangmai Pakchong, Muangmai Buayai, and Muangmai Nongrawiang. The researchers used a simple sampling plan: 4 areas, 50 samples per are--making a total 200 samples. (2) Executives of large industrial plants located in the area of Nakhon Ratchasima Province: area entrepreneurs in Suranaree City, Pak Chong City, New Bua Yai City, Nong Rawiang City. The researchers used a simple sampling plan: 4 management groups, 50 samples per area--making a total of totaling 200 samples. The total number of respondents was 400.

8. Research Results

8.1 Summary of Research Results

The management level in business operations that is friendly to the environment of the industrial factories in Nakhon Ratchasima Province by each factor is shown in Table 1.

Table 1: The Management Levels in Environmentally Friendly Business Operations of Industrial Factories in Nakhon Ratchasima by Factors

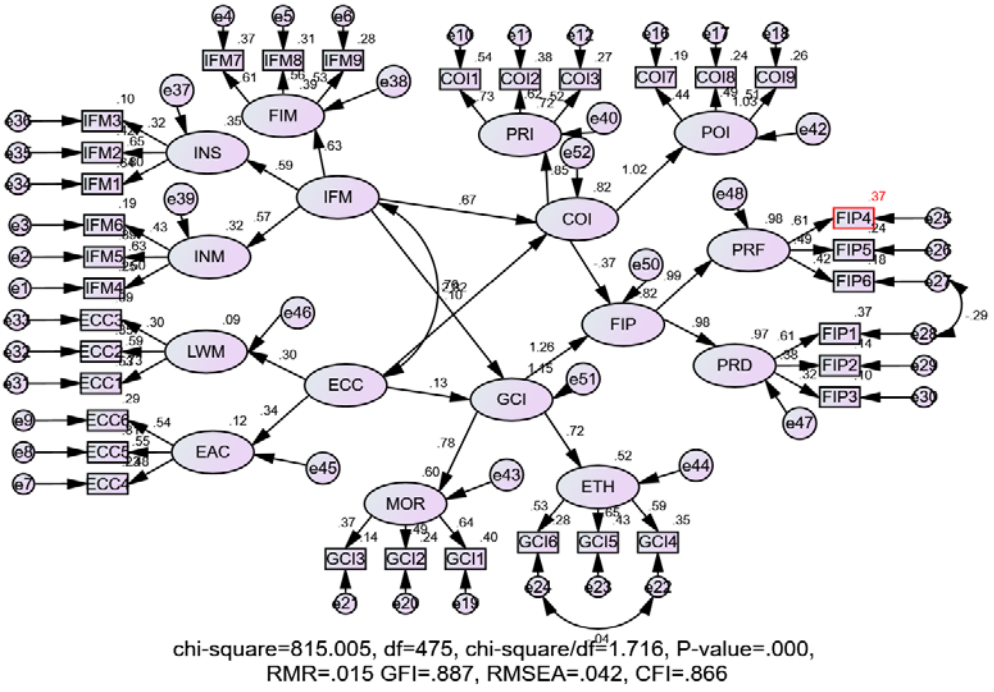
Factor	Mean	Standard Deviation	Coefficient of Variation	Paraphrase
Industrial Factories Management (IFM)	4.43	0.53	0.12	high
Corporate Innovation (COI)	4.47	0.52	0.12	high
Embeddedness of Corporate Social Responsibility Culture (ECC)	4.43	0.54	0.12	high
Green Corporate Image (GCI)	4.55	0.51	0.11	highest
Firm Performance (FIP)	4.48	0.52	0.12	high

Table 1 compares the means of the management factors and the Embeddedness of Corporate Social Responsibility Culture factor as exogenous factors. It was found that the coefficients of variation were equal. The CSR culture's ingrained factors were slightly higher on average. The dependent factor (endogenous factors) consists of intermediary factors. When comparing the Corporate Innovation factor and the Green Corporate Image factor, the researchers found that the Green Corporate Image factor had higher scores and also had a lower coefficient of variation.

8.2 Hypothesis Testing in the Research Conceptual Framework

Figure 1 and Table 2 were meant to explain Hypothesis Testing in the Research Conceptual Framework.

Figure 1: The Results of the Analysis of the Covariance-based Structural Equation



As shown in Table 2, the test results of the management model in environmentally friendly business operations of the factories industrial work in Nakhon Ratchasima Province revealed the correlation coefficient of the Embeddedness of Corporate Social Responsibility Culture, Green Corporate Image and Firm Performance factors at 0.823, 0.988 and 0.821, respectively, which were classified as high with interpretation as follows: (1) the Industrial Factories Management (IFM) had a positive influence on Corporate Innovation (COI),
(2) Industrial Factories Management factors (IFM) had a positive influence on Green Corporate Image factors (GCI),
(3) Corporate Innovation factors (COI) and Embeddedness of Corporate Social Responsibility Culture factors (ECC) had a positive influence on Corporate Innovation factors (COI), and
(4) Green Corporate Image factors (GCI) had a positive influence on Firm Performance factors (FIP).

Table 2: The Coefficients, Standard Deviation and t-Statistic in Hypothesis Testing

Hypothesis	**Standard Coefficient**	**S.E.**	**t-test**	**P-value**	**Conclusion**
EFM-> COI	0.969***	0.666***	6.708	0.000	support
ECC -> COI	0.366***	0.099***	3.195	0.001	support
IFM -> GCI	0.878***	0.764***	6.518	0.000	support
ECC-> GCI	0.374***	0.128***	3.889	0.000	support
COI -> FIP	-0.352	-0.369	-0.867	0.385	not support
GCI-> FIP	1.527**	1.261**	2.992	0.003	support

*p=.05, ** p=0.01, ***p=0.001

Table 3 displays the factors of Industrial Factories Management (IFM) having a weight of total influence on the Firm Performance factor (FIP) at approximately 5 times higher than the total influence weight of the Embeddedness of Corporate Social Responsibility Culture factor (ECC), with the Green Corporate Image factor (GCI) acting as a variable. The central influence on the Firm Performance factors (FIP) was as high as 1.261, while the Corporate Innovation factor (COI) had the opposite influence on Firm Performance factors (FIP) at -0.369.

Table 3: Direct Influence of Factors Calculated from Standard Coefficients

Factors	**R^2**		**IFM**	**ECC**	**COI**	**GCI**
COI	0.823	DE	0.666	0.238	NA	NA
		IE	NA	NA	NA	NA
		TE	0.666	0.238	NA	NA
GCI	0.988	DE	0.764	0.128	NA	NA
		IE	NA	NA	NA	NA
		TE	0.764	0.128	NA	NA
FIP	0.821	DE	NA	NA	-0.369	1.261
		IE	0.718	0.125	NA	NA
		TE	0.718	0.125	-0.369	1.261

8.3 Model Harmony Index from SEM Covariance-based Analysis

The tests for the harmony of each model of empirical data appear as follows:

x^2 /df = 1.716, RMSEA = 0.045, NFI = 0.803, CFI = 0.866, IFI = 0.869, RFI = 0.789, RMR = 0.015. There were 9 standard indices, comprising 3 good fit indexes and 5 Mediocre fit, and 1 Acceptable. It was concluded that the model should be suitable for the empirical data at the valid level.

9. Discussion of Results

The results of the evaluated five factors in the research conceptual framework of the sample group in Industrial Factories Management factors overall at the average 4.43 -- a high level with a coefficient of variation of 0.12, which is much lower than 0.30, indicating the respondents somewhat disjointed. The result supported the earlier studies by Russo & Fouts (1997) and (Sambasivan et al., 2013) that emphasized the importance of the environment in the context of the industry, and that executives must play a role and implement the environmental strategy in a concrete way in the dimension of the words "Environmentally friendly industrial management," with factory or industrial management that utilizes resources efficiently, waste recovery recycling in the production process, and prevention of pollution problems by using clean technology (Pigosso, Rozenfeld & McAloone, 2013). In this particular research in 2013, the researchers asserted that the factors of industrial plant management as assessed by the executives in each company under study were at a high level, thus showing a good trend. In addition, all aspects of production management, warehousing and resource management were evaluated by the sample at a high level.

The ingrained factor of the Embeddedness of Corporate Social Responsibility Culture (ECC) culture appeared to have a positive influence on Corporate Innovation factors (COI); and the Embeddedness of Corporate Social Responsibility Culture (ECC) positively influenced the Corporate Innovation factor (COI). Such a result corresponded with the findings reported by Ouchi et al. (1984), Odom (1990), and Ahmed (1998) that pointed to an organizational culture of shared values in the environment as having impact on employees' organizational commitment to environmentally-focused production processes as innovations. Sutton & Kramer (1990) were also in favor of environmental changes, such as knowledge sharing culture as an important foundation for innovation. In addition, the behavior of the organization's employees that expresses their willingness to protect the environment at work and living in society also affects the corporate image of the company they are working for (Alavi & Leidner, 1992; Ipe, 2003).

The result on the Green Corporate Image factors (GCI) positively influencing Firm Performance factors (FIP) agreed with the findings by Kotler & Keller (2006) and Zameer et al., (2020) in that recognition of the image of the organization for the environment of the customer will affect consumers' impression with the organization's environmental activities that benefit customers regarding their purchased products and services--in turn enhancing the value of the products and services. It should be noted that organizational commitment to environmental protection for the future and for sustainability through corporate social responsibility practices has become part of creating value for the business.

This point was earlier expressed by Bathmanathan & Hironaka (2016) and Yadav et al. (2016) that building trust in a Green Corporate Image will lead to customer engagement, support, and sustainability of business, especially those in the new generation of consumers who are environmentally conscious. Creating a corporate image of environmentally friendliness would serve as an organization's strength in competing and increasing market share (Chan, 2009; Geerts, 2014).

As for the unsupported result on Corporate Innovation factor (COI) positively affecting Firm Performance. The researchers interpreted as stemming from uncertainty of product innovation, as 80% of the businesses under study produce capital goods. The outstanding innovation in the product was not visible in the study perhaps accounted by their customers' specific order. Therefore, the result on the impact of Corporate Innovation on Firm Performance in this study could result from the management's focus on the innovation process, while putting more weight on cost reduction and maintaining international environmental standards (OECD, 2005; McKeown, 2008).

9.1 Research Benefits

Based on the research findings on the positive impact of Green Corporate Image on Firm Performance expressed by the respondents under study, the researchers would like to touch on two points for environmentally friendly business operations of medium and large industrial factories in Nakhon Ratchasima Province.

(1) In terms of policy on green industries, business operations need to observe international production standards in their clearly-defined plans and objectives for real practice in a concrete manner. In this aspect, companies in the manufacturing industry can jointly create clear guidelines for environmental production using international standards set by the state and transfer it to the practical level in their factory. A common and mutual understanding of green industries should be explicated for sustainable production.

(2) In practice, it is vitally important to promote cooperation in manufacturing innovation regarding the innovation process in the main group of factories in Nakhon Ratchasima Province that directly take orders of products from their customers. Therefore, cooperation in inventing innovations for environmentally friendly production suitable for the area can be done via research and development (R&D) to create new knowledge pertinent to the business group in Nakhon Ratchasima Province. This is to enable the province's industry to manage environmentally friendly production efficiently for harmony with the communities concerned. The important thing is to strengthen the ingrained culture of social responsibility culture in all stakeholders.

(3) Since the results of this research appeared to support the theory of organizational resource management (Resource-based Theory) in organization management, the researchers would like to see further human resource development of the deepening of social responsibility culture expanded as a collective culture (Collectivism) in the context of environmental protection for the well-being of the target society.

9.2 Future Research.

Since the country's income was recorded 621,668 million baht in 2020 for the production of capital goods for both export and domestic consumption including the industrial chain and tourism, business operators have become aware of needs for service innovations, especially after the epidemic crisis. In this regard, guidelines for the study of management roles and the development of the service industry deserve a great deal of attention on technological leaps for sustainable support. Those issues on service innovation and technological applications require further research into the dimension of human resources (Soft Assets) in parallel with the management of Machines (Hard Assets) based on the selected theory of management-based resources (Resource-based view). All of these are for all business operators concerned to compete effectively in both the capital product industry as well as the service industry.

10. The Authors

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Sharing Professional Viewpoint

Support for Thai Teachers of Language, Mathematics and Science

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1. Introduction

Many countries have a basic policy to provide learning opportunities to all children regardless of their backgrounds. However, differences in backgrounds are actually very significant. These include parents' occupations and educational levels, even their home possessions. These have been shown to be predictors of performance in reading, mathematics and science, for example (Ikeda, 2022).

It is important to find ways to bolster the educational achievements of children attending schools, particularly those in small towns and rural areas. These schools have difficulty in attracting and retaining qualified teachers.

This Viewpoint article presents some facts about the need to provide additional support for teachers.

2. PISA

The PISA test (Program for International Student Assessment), was created to measure the skills and knowledge of 15-year-old students in reading, mathematics and science. The tests draw upon the content which can be found in curricula across the world (Organization for Economic Cooperation and Development, 2022).

In 2018/19, some 600,000 students, representing about 32 million 15-year olds in some 79 participating countries, completed that year's assessment. Thailand's 15-year olds came in at 63rd out of 68 nations (OECD, 2022).

In the same year the scores on Thailand's own end-of-year tests revealed similar results. The average scores for all children were all below 50%. However, these results were not completely unexpected for several reasons (Me, 2020).

An earlier study carried out by the Thai government's own testing department revealed that the teachers of mathematics, science, and computer studies failed the same tests which their students had taken (ASEAN Now, 2010).

National Test Scores of Thai Teachers 2010

Thai Language	Mathematics	Sciences
42.2%	25.4%	29.2%

These results revealed a large deficit in teachers' knowledge of the very subjects they were assigned to teach. It would take years to correct these imbalances before they

could be minimised. Incidentally, since the 2010 report there has been no follow-up study of teacher competencies. However, the results as such have prompted the Ministry of Education to take an urgent action on in-service training programs for the basic education subject teachers concerned on a national scale. There have also been discussions on the issue of the suitable type of the national test—be it achievement- or placement-based. So far, the Thai public has not heard of a concrete solution.

3. Internet Resources for Teachers

The COVID 19 pandemic has led to the creation of an enormous number of on-line learning resources for children and their teachers who have been assigned to teach subjects for which they are not qualified nor confident. These same resources can be used by parents who have time and interest in home schooling.

Videos provide many positive features for learners and their teachers. At a basic level, children get to hear voices which are different from their teachers. Different voices can increase children's attention spans. Professional videos normally incorporate visuals such as photos, charts, and even sound effects, which can enhance understanding and retention of the material being taught (Salines, 2019).

When watching a video students are hearing correct pronunciation of terminology and expanding their listening vocabulary, for example. Although watching videos is a passive activity it provides a 'balanced learning experience' (Young, 2022).

4. Training Workshops

Training in the use of videos as supplements to teachers' daily lessons is essential. Not only would it provide teachers with new skills but also greater confidence. The training could be in the form of hands-on workshops. These should be at locations easily accessed, such as the local area offices of the Ministry of Education. Perhaps teacher training colleges should also provide the next generation of teachers with practice in the use of Internet resources.

If these suggestions were to be adopted, reading and writing Thai language should be given top priority. The ability to read and write one's own language is essential for obvious reasons.

Additionally, it would be important to invite the cooperation of Internet suppliers to upgrade the quality and reliability of their services especially to rural schools nationwide.

5. Selecting Videos to Support Teachers of Key Subjects

Selecting videos for use in the classroom should as much as is possible involve the teachers themselves. It can give them a sense of 'ownership'. The normal 'top down' type of decision making should be avoided wherever practical (Suarez-Alvarez, 2021).

In the case of video-enhanced lessons in mathematics for older children it is recommended to include basic knowledge about money, including fake money. In the case of science lessons, it is recommended that teachers should include videos which focus on protecting the natural environment.

6. Readers of *RICE* Journal

Readers of *Rice Journal* are invited to share their viewpoint on this topic of 'ensuring a more level playing field for all students'.

7. The Author

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1. Policy

RICE Journal of Creative Entrepreneurship and Management (RJCM) has its focus on original contributions on research work or academic issues in the areas of creative entrepreneurship and management as practiced by academics or scholars in their fields of specializations in social sciences. Currently, it is classified as Tier 2 in Thai-Journal Citation Index (TCI). It is a double-blind three-peer-reviewed journal and each volume is published online-plus-print thrice a year: No.1 in April, No.2 in August and No 3 in December. Original research articles, academic papers and brief professional viewpoints for sharing will be included in this journal. The details and views expressed in the published papers are entirely the responsibility of those authors.

2. Submission of Manuscripts

Authors should submit a non-formatted WORD file of their manuscript in single spacing (see Section 3: For Authors below) to Editor-in-Chief 2 Ruja Pholsward <rujajinda@gmail.com>.

- The Office of the Editors-in-Chief is at Science and Technology Building, Floor 4, Rattanakosin International College of Creative Entrepreneurship, Rajamangala University of Technology Rattanakosin, Thanon Putthamonthon Sai 5, Salaya, Nakhon Pathom 73170, Thailand.

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- The latest date for submission of the first draft of the manuscript to be published in *RJCM* each year: (1) Number 1 in February, (2) Number 2 in June, and (3) Number 3 in October.

3. For Authors

Arrangement and Style of Manuscript

3.1 Paper and Page Setup:

Paper size: Standard A4

Top margin: 1 inch	Bottom margin: 1 inch
Left margin: 1.25 inches	Right margin: 1 inch
Header: 0.5 inch	Footer: 0.5 inch

3.2 Manuscripts of Original Articles, for both print and online versions, should be submitted in a WORD file of the A4-sized paper, using the Times New Roman (12-point font). Symbols used should be of a similar size and typed on the corresponding lines of text used in each section. Manuscripts of the original article should contain the following sections: title, author's name, author's workplace, abstract and keywords, the main text/ body text, acknowledgements, references, tables, figures, captions/legends and illustrations.

Each page should be clearly numbered in the bottom center of each sheet. Authors should carefully edit and proofread their manuscripts before submission.

3.2.1 The title: The **title of the article** must not exceed 2 lines. A title itself has to be informative and indicates the main topic in the article. The title should be set in the center of the page, using upper and lower case letters of Times New Roman 12 points and printed bold. If there is any symbol, its size must be the same as the text in that line.

3.2.2 Author's name: The author's name and last name are in Times New Roman 11 points in upper and lower case letters in the center of the page below the title of the article. In the case of multi-authorship, identify each author by superscript numbers at the end of the author's last name.

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3.2.4.1 Abstract should be informative and state what was done, obtained and concluded. It should be accurate, self-contained, concise and specific, coherent and readable, and reflect only what appears in the original paper. An abstract should contain the following basic components: (1) purpose/motivation/problem statement, (2) methods/design/procedure/approach, (3) results/findings/products, (4) conclusion/applications/research limitations/implications (if applicable), practical implications (if applicable), pedagogic or social implications (if applicable), and (5) originality/value. The length of the abstract should be about 150 words and not exceed 200 words. Type the word "**Abstract**," using Times New Roman 11 points and print bold, left-hand justified. The abstract should be written in one single-spaced paragraph under the heading.

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3.2.6 In-text Citations: Authors are to give references to all the information obtained from books, papers in journals, websites, or other sources. The Author-Date System should be used to cite references within the paper by using the author's last name and date (year), separated by a comma in parentheses; for example, name(s), year.

3.2.7 Tables and Figures:

3.2.7.1 Tables: The large-sized table format should not be split into two columns but small-sized table can be fit into the column. Each table must be titled, numbered consecutively and complete with heading (title with a description that goes above the table). The word "**Tables**," including number should be typed using Times New Roman 11 points and bold, left-hand justified, and follow by regular 11 points Times New Roman for the heading.

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3.2.8 Symbols and Units: Every used symbol must be defined in the text and written in the simplest possible way.

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3.2.10 Reference Lists: The final page contains a list of resources cited in the paper. The style of citations used in RJCM should conform to the American Psychological Association (APA). It is the author's responsibility to ensure the accuracy of all references cited in the paper. References should be listed in alphabetical order using regular Times New Roman 11 points.

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Author.//(Year of publication).//Title of Abstract (abstract).//*Journal Title, Year,Volume(*Number), /Page number.

Example:

Osti, L. & Cicero, L. (2018). Tourists' perception of landscape attributes in rural tourism (abstract). *Worldwide Hospitality and Tourism Themes, 2018, 10*(2), 211.

Books

Format:

Author.//(Year of publication).//*Title*.//Edition (if any).//Place of publication: Publisher.

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Wallace, M. & Wray, A. (2016). *Critical Reading and Writing for Postgraduates.* Third edition. Thousand Oaks, California: Sage Publications Inc.

Book Articles

Format:

Author.//(Year of publication).//Article Title.//Editor(s) (if any).// *Title of book*.//Edition (if any).//Place of publication:// Publisher,/Page Numbers.

Example:

Hickman, G.R. (2010). Concepts of leadership in organizational change. In Preedy, M., Bennett, N. & Wise, C. (Eds). (2012). *Educational Leadership: Context, Strategy and Collaboration.* Thousand Oaks, CA: SAGE Publications Inc., 67-82.

Conference and Seminar Proceedings
Format:
Conference or Seminar Organizer.//(Year of publication).//*Name of conference,/ Conference date.*//Place of publication (if any):/Publisher (if any).

Example:
Jareonsubphayanont, N. (2014). The international student policy in Thailand and its implication on the 2015 ASEAN Economic Community. *Southeast Asian Studies in Asia from Multidisciplinary Perspective International Conference*, March 2014, Kunming, China.

Dissertation or Thesis
Format:
Author.//(Year of publication).//Title of dissertation or thesis.//Type of Thesis.//Awarding Institution.
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Editorial
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Author.//(Year of publication).//Title of Editorial (editorial).//*Journal Title,/Year (Volume if any),*/Page numbers.
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Websites
Format:
Author.//Title.//(Online).//the full address of the web page, accessed date.
Example:
Charlotte, B. Quotes about Action Learning. (Online).
http://www.goodreads.com/quotes/tag/action-learning, January 18, 2017.

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The length of Brief Professional Viewpoints for Sharing is about 8-10 typed A4 pages. Its content should be arranged as follows: **title**, **name of the author, name and address of the institution**, **3-5 keywords**, **body text**, **the author's biography** of 50-80 words, and **references**. The format, font, and font size used in each section correspond to those in the section of **3.2. Manuscripts of Original Articles**.

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Authors or paper contributors shall not submit simultaneous or duplicate manuscripts. It is imperative that authors submit work of original investigation and acknowledge concepts, research methodology and findings of preceding authors or researchers by giving proper references. If required, authors need to seek permission for the use of specific data or adaptation of research methodology as well as provide evidence on approval of professional ethics in the selected field of study. Plagiarism of all kinds is unacceptable and will result in paper rejection and permanent dismissal by *RJCM*. Authors shall be solely and fully liable for all viewpoints and research components used in published papers.

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RJCM publishes three numbers per volume annually and welcomes contributors to submit their manuscript in January, May, and September of each year. We accept both academic and research papers in social sciences from contributors. The papers are double-blind three-peer-reviewed in each volume and published online-plus-print thrice a year.

The length of the unformatted manuscript in WORD can be 15-25 pages in length including references. The contents of the manuscript should include (1) a title with the author's name, affiliate, email address and telephone contact, (2) an abstract of 150 words with 3-5 keywords, (3) an introduction, (4) a rationale and background of the study, (5) research objectives, (6) research methodology, (7) data collection procedure, (8) data analysis, (9) results and discussion, (10) research limitation (if any), (11) conclusion, (12) acknowledgement(s) (if any), (13) the author's biography of about 50-80 words, (14) references, and (15) an appendix or appendices (if any).

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