# Message from the Editor

Like its previous issues, the current one NIDA Development Journal (NDJ Volume 61 Number 2, July-December 2021) features research articles covering a range of subject areas, including Public Administration, Tourism, HRD, Higher Education, and Foresight Studies.

In the first article, **"Utilizing Resources for the Future Work Arrangements"** by Dr.Gorn Huvananda of NIDA's School of Public Administration. In this article, it is pointed out that in the VUCA (volatility, uncertainty, complexity and ambiguity) environment, the world faces many new challenges. As a result, flexible work arrangements such as WFH (work from home) have emerged as one of the key themes in the HRM realm. The article contributes to the understanding of HRM through foresights that promote strategic policy making for the organization's sustainable growth in the long run.

A related area of investigation is presented in the article **"Roadmaps for Developing Thai Public Agencies Towards the Inspiration Level of the Sufficiency Economy Philosophy"**, Dr.Bongkot Jenjarrussakul and Prof. Dr.Kalayanee Senasu of NIDA's School of Human Resources investigate roadmaps for developing Thai public agencies to operate on basis of the Sufficiency Economy Philosophy.

The third article, **"Resilient Future Strategy of Full-Service Airlines Industry in Thailand"**, shifts our attention to Tourism. The authors, Nuttapun Poomthan, Pheerawat Thaweewatthanaphong, Saiphon Dangdaje, and Supak Nunabee, all affiliated with NIDA's School of Tourism Management, focus their research interest on aviation business with a view to analyzing, from a foresight perspective, future aviation after the COVID-19 situation has subsided and returned to normalcy, as well as the future aviation setting in the next ten years.

The next article shifts our attention to still another subject area – Higher Education. In this article, **"Challenges of Research University in Thailand in the Era of Education Disruption"**, the authors, Dr.Chutimon Narawish and Pakkapol Lohakulwich of Rangsit University's International College, show how, in the current time of disruptive transformation, practically all universities are currently involved in attempts to adapt and change themselves to the changing higher education market, finances, and technology.

The fifth article, **"Thailand's Foresight Landscape"**, presents an exciting academic theme. In this article, the author, Dr.Thasanawan Boonmavichit of the School of Public

Policy, Chiang Mai University, explores the history of foresight programs in Thailand, their development, and current practices in proportion to the global foresight landscape and its underlying epistemologies, emphasizing the importance of making explicit our philosophical presupposition, as it reflects the direction of foresight practice and tool selections for foresight practitioners in Thailand.

The last article by Boonkiart Iewwongcharoen of the Graduate School of Management and Innovation, King Mongkut's University of Technology Thonburi, and Assoc. Prof. Dr.Nathasit Gerdsri of College of Management Mahidol University, offers still another exciting academic theme. In this article **"Linking Situation Analysis and Research Network Analysis into Roadmap Development: A Case Study of NLP (Natural Language Processing)"**, the authors present the creation of development guiding maps, also known as the "Roadmap," as a strategy for developing the countries or organizations.

We are confident that the research articles being featured in this issue, which cover a variety of subject areas, will be of substantive interest to academics as well as practitioners in all those areas. The editor would like to thank all members of the editorial board, the scholars who have kindly reviewed the articles, and the support staff of the Research Center of NIDA, who have contributed to the production of this issue of the NIDA Development Journal, and, last but not least, the journal subscribers and all its readers.

Patthareeya Lakpetch
Editor

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# Contents

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# Utilizing Resources for the Future Work Arrangements

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## Abstract

In today's VUCA environment, the world has faced many uncertain challenges, from technological disruptions to demographic changes that lead to new behaviors that result in inevitable business transformations. Adding to that, a global pandemic of COVID-19 has greatly affected all people's adjustments to the "new normal" ways of living. As a result, flexible work arrangements such as WFH or remote work have emerged as one of the key themes in the HRM realm following the changing terrain. Given that these arrangements have managerial implications for the leadership and decision-makers, this article aimed to portray the impact of the changes in global terrain on how people adjusted to the new way of working. Furthermore, given that COVID-19 outbreaks are likely to persist and become a local epidemic, this article attempted to forecast the future of work arrangements, including innovative ways for people to adjust to new ways of working. Key themes emphasized new skills and competencies required in response to the digital landscape, flexible work arrangements from the physical workplace to how actual tasks and work can be restructured to suit organizational needs, as well as fostering a sense of community that promotes human interactions to support learning and knowledge transfer. The article adds to the understanding of HRM through foresights that promote strategic policy making and contribute to the organization's sustainable growth in the long run.

**Keywords**: HRM; WFH; Remote Work; Flexible Workplace; Human Capital

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# รูปแบบของการทำงานในอนาคต: มุมมองการใช้ทรัพยากรให้เกิดประโยชน์สูงสุด

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## บทคัดย่อ

ปัจจุบันโลกเผชิญกับสภาวะของความไม่แน่นอน ทั้งการดิสรัปท์เนื่องด้วยความก้าวหน้าทางเทคโนโลยี และความเปลี่ยนแปลงของพฤติกรรมผู้คน ที่ธุรกิจจำต้องมีการปรับเปลี่ยนเพื่อความอยู่รอด นอกจากนั้น สภาวการณ์จากการระบาดใหญ่ของโควิด-19 ก็ได้ส่งผลต่อวิถีชีวิต ก่อให้เกิดวิถีปกติใหม่ ที่ทั้งคนและองค์กรต้องปรับตัว หนึ่งในประเด็นเกี่ยวกับการจัดการทรัพยากรมนุษย์ คือ ความยืดหยุ่นของรูปแบบในการทำงาน อาทิ การทำงานจากบ้านหรือที่ใดก็ได้ ซึ่งมีผลกับการปรับเปลี่ยนวิธีการดำเนินงานขององค์กรในหลาย ๆ ด้าน บทความนี้ได้วิเคราะห์ข้อมูลที่เกี่ยวข้องเพื่อคาดการณ์รูปแบบของการทำงานในอนาคต โดยเฉพาะเมื่อคาดว่าสภาวการณ์โรคโควิด-19 มีแนวโน้มที่จะคงอยู่ไปอีกช่วงระยะเวลาหนึ่งจนกว่าจะกลายเป็นโรคระบาดประจำถิ่นในที่สุด ประเด็นสำคัญที่ได้จากการสังเคราะห์ คือ องค์กรต้องมีการเสริมสร้างทักษะและสมรรถนะใหม่ที่ทันต่อการเปลี่ยนแปลงโดยเฉพาะด้านดิจิทัลและเทคโนโลยี รวมถึงเพิ่มความยืดหยุ่นทั้งในแง่ของวิธีการจัดระบบงานและสถานที่ทางกายภาพ โดยไม่ละทิ้งซึ่งมิติทางสังคมที่ยังคงเอื้อต่อการมีปฏิสัมพันธ์ของบุคลากรและส่งเสริมการแลกเปลี่ยนเรียนรู้ ท่ามกลางวิถีปกติใหม่ของการทำงาน การทำความเข้าใจถึงการเปลี่ยนแปลงและคาดการณ์ภาพอนาคตของการทำงานยุคใหม่ จะสนับสนุนการวางนโยบายเชิงกลยุทธ์ในการบริหารจัดการทรัพยากรมนุษย์ เพื่อสร้างการเติบโตที่ยั่งยืนให้กับองค์กร

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## Introduction

Flexible work arrangements have become mainstream in the realms of HRM for some years, even before the COVID-19 pandemic. Many organizations have urged their employees to determine their own mix between coming to work at the office and working remotely from other locations, resulting in more flexible work arrangements (Hayman, 2009; Hunter, 2019). Such arrangements have been known to be attractive to many employees, especially those who may have duties to take care of their family members such as the elderly or newborns, and have led to an increase in remote workers (Chen & Fulmer, 2018; Groen et al., 2018). With the aid of technological support, digital nomads are one of the phenomena that reflect this notion of flexible work arrangements, with the aid of which they can move around geographically and perform tasks and duties with the same levels of expected standards as if they were working from their office base (Olga, 2020).

The gig economy is also another form of flexible work that benefits from technology, which allows gig workers to utilize their skills, knowledge, time, and resources to generate additional work opportunities and income through outsourced assignments or task-based work (Sullivan & Jarrahi, 2017; Vallas & Schorr, 2020). For instance, full-time office employees may opt to become rideshare drivers after their regular working hours, and they may earn more from the likes of sharing economy platforms.

Furthermore, Work From Home (WFH) is considered to be one of the phenomena that has risen out of the COVID-19 pandemic to comply with social distancing measures implemented by most nations to control the spread of the disease. Therefore, WFH emerged as a global phenomenon where millions of employees around the world locked themselves in their confined spaces and utilized technology to continue operating in a new normal way. Many workers who have turned remote have adapted themselves to this new normal practice, including the conduct of virtual meetings in lieu of physical ones, so that they could maintain the efficiency and effectiveness of work performed compared to the pre-pandemic period (Jalagat & Jalagat, 2019). They also need to further hone and sharpen these newly acquired skills as organizations continue to operate on a fully remote basis (Galanti et al., 2021; Gallacher & Hossain, 2020; Wang et al., 2021).

In addition, natural resources are constantly depleted, and capitalism still encourages excessive consumption of resources. Therefore, sustainability issues become

a critical challenge in managing resources into the future (Feola, 2020; Pierleoni, 2020). Together with the continued decline in the global birth rate, it is inevitable that future work patterns need to be reflective and adaptive to these demographic and environmental concerns. Remote work technologies, in particular, would become the enabling condition that allows employees to create value for the organization regardless of location (Baker et al., 2007; Model, 2021; Toscano & Zappala 2021).

Assuming that these setups have strategic implications for leaders and executives, the purpose of this article was to illustrate the potential scenarios where employees transition to the new method of working as a result of changes in the global landscape. Furthermore, given that COVID-19 outbreaks are projected to continue and ultimately become a local epidemic, this article attempted to anticipate the future of work arrangements, suggesting innovative ways for workers to acclimatize to new ways of working. It used to be that flexible work arrangements were a luxury for only certain groups of working professionals, such as freelancers and digital nomads. Given the state of the pandemic, most office premises will likely be impacted, and hence their employees. A limited number of functions may still be required to operate on-site, such as building supervision, security services, and housekeeping. It is inevitable that their daily operations will be affected by public and corporate policies, and that they will have to navigate through confusion and uncertainties. Thus, most employees would be impacted by the circumstances to some degree, whether positively or negatively. As time goes by, people start to get used to working from their own space, though preferences differ from one group to another, indicating that there would not be one right formula for all.

The novel skills and competencies required in response to the adjusted landscape, flexible work arrangements from the physical surroundings to how actual tasks and work can be reconstructed to meet organizational needs, and fostering a sense of community that encourages human interactions to facilitate learning and knowledge transfer were all highlighted as key themes. The article contributes to a better understanding of human resource management by providing foresights that aid strategic policymaking and make a significant contribution to the organization's long-term sustainability.

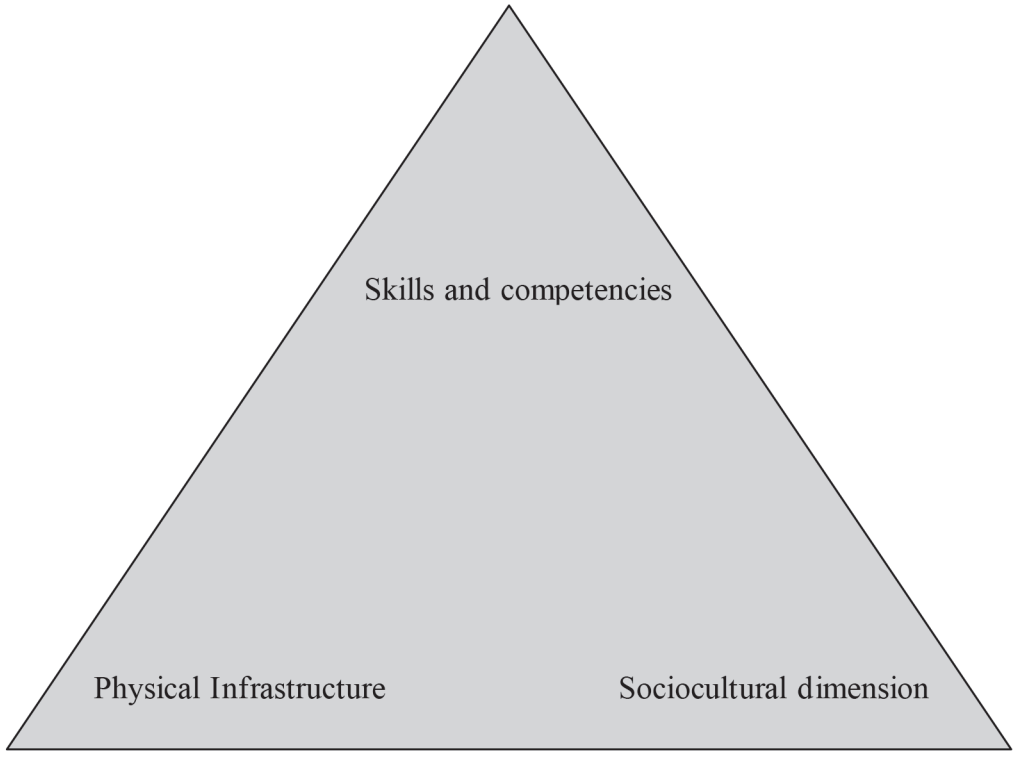


**Figure 1:** Diagram Illustrating Three Critical Areas of Future Work Arrangements

Following the aims stated, three critical areas are identified to reflect the changes required to thrive in the future work environment. They cover the areas of skills and competencies, physical infrastructure, and the sociocultural dimension.That said, people have to possess new skills and competencies that are compatible with the digital era and the new norms. It is important as knowledge and skills become obsolete at a much faster rate than ever. Skills that have been useful may be totally irrelevant in the years to come. Thus employees have to be well prepared to relearn and unlearn to acquire literacy in things that have never existed in the world before, such as the Metaverse.

As for physical infrastructure, it should be equipped with the elements that cater to a highly diverse workforce who may operate on different terms, from public transportation to urban housing. Given that more employees have the luxury of working from any remote location, the infrastructure as well as policy designs should be inclusive to provide what these diverse workers have come to expect. Finally, human interactions and socialization continue to be pivotal enablers that foster a sense of community and drive knowledge

sharing and transfer. Without these relationships and connectedness, employees may not feel engaged with the organization and team, and may face adverse psychological effects of being removed and neglected. In the subsequent sections, these emergent themes will be further elaborated to demonstrate how they may be of significance to organizational change and transformation amid the volatile future.

## Future Work Arrangements in Thematic Areas

*Skills and competencies*

Employees will be required to develop new skills and competencies to cope with the disruption and the pandemic. Organizations have to engage in transformations that leverage technologies to bring about desired outcomes. Automation, virtual realities, and the metaverse are some of the recently upgraded technologies that may be useful for future operations.Employees must learn new skills and competencies that are up to date and can be applied to changing terrains in the post-pandemic era (Nash, 2020). Agility and resilience would be critical elements that support the organizations' adaptability, whereas human capital, structure, and processes will be revisited to align with the changes in strategies and practices under the new normals (Cheese, 2020; Micelli et al., 2021).

The newly acquired skills and competencies will nonetheless be interrelated with various types of literacy, i.e., digital literacy, artificial intelligence (AI) literacy, virtual reality (VR) literacy, and other tech-related literacies. Such understandings would empower the employees to apply technologies to their regular functions effectively, while bringing out key strengths and limiting the weaknesses of the systems. Meanwhile, organizations would be able to plan ahead in terms of policy formation and strategy implementation, which focused on the achievement of goals and objectives at both the organizational and individual levels.

Apart from mastering the above-mentioned literacies, empathy remains a crucial aspect that employees need to consider when working alongside emergent technologies (Lim & Okuno, 2015). This is because humans still hold an edge over technology when it comes to understanding each other and interpreting revolving contexts (Leite et al., 2013; Montemayor, Halpern & Fairweather, 2021). Therefore, human capital would likely

develop the skills and competencies required to govern and work alongside these intelligence systems in order to fulfill organizational mission and goals. For instance, firms may still require personnel to control and troubleshoot the automated call center given that the system may not be able to handle customers' special requests, which it has not been programmed to function.

In terms of developing the skills and competencies, Human Resources (HR) ideally consults with respective units to familiarize themselves with the role of emergent technologies. HR should point out how such technologies will influence the way of working both during and after the pandemic so that employees have ample time to adapt and adjust to the changes in work-related contexts. HR is also responsible for job analysis and key competencies that need to be developed and elevated in response to the changes. HR also acts as a catalyst to encourage staff to capitalize on the application of technologies in order to enhance work effectiveness. Training and development have become a key aspect of staff continuous learning and development (Adedoyin & Soykan, 2020). In particular, HR should prepare employees to learn, relearn, and unlearn with the aim of providing new skills and brushing up on those that need updates, as well as to urge the depletion of obsolete skills and knowledge to support the transformation after the disruption (Becker, 2019; Cegarra-Navarro & Wensley, 2019).

This article attempts to use the futurist integrative lens to identify and envision potential changes in work arrangements in the future.Job reclassification emerges as an important area in which the emphasis will be placed upon task-based and output-based types of jobs rather than the standard position-based or functional-based jobs. Furthermore, outsourcing and the flexibility to work multiple jobs with the aid of gig economy platforms will likely come mainstream, especially with the Gen Z population that has just entered the workforce in recent years. This group of people values freedom and flexibility, as reflected in the popularity of freelancing, short-term projects and contracts, as well as entrepreneurial endeavors, which offer higher freedom and flexibility compared to traditional office full-time work (Baldonado, 2018; Maloni, Hiatt & Campbell, 2019).

From the job analysis perspective, tasks are the elements that make up a role profile. While the job description clearly states the roles, responsibilities, and scope of

work for the given functional position, This allows the organization to conduct workforce planning by optimizing the headcount that suits the size of the entity in attaining its mission. When the future work prospects require organizations to transform and change, they need to consider reorganization by grouping the work and its structure to align with new technology adoption and corresponding changes in future work arrangements.

Organizations should break down the high-level tasks into smaller pieces, as in the form of sub-tasks, which would allow for other colleagues or team members to substitute and carry on others' tasks when in need, irrespective of their functional positions. As a result, jobs and tasks are better reallocated to the actual emerging needs of the organization. Flexible job reclassifications are ideal for reaping the benefits of a matrix organizational structure, and resources can be effectively allocated to meet the demands and needs for manpower. On the other hand, personnel could further develop expertise for career growth and advancements in a diverse manner, not technically bound by the seniority system or, as usually the case, a vertical hierarchy with its typical linear structure (Huvanandana, 2022).

By utilizing more flexible work arrangements, HR should place a strong focus on designing performance appraisal systems that deploy suitable measures and tools to reflect upon the enhanced degree of work flexibility as well as an applicable flat organizational structure. For instance, in terms of rewards, HR may utilize pay or incentives issued per output or performance to focus on the outcomes and impact that genuinely matter to the attainment of the mission.

From the employee's perspective, they may utilize their skills, competencies, and expertise to create value and impact for numerous entities. They may enter into multiple contractual work agreements or even register on a roster list of technical experts so that their skill sets can be deployed in a variety of opportunities.

Networking site like LINKEDIN is viewed as a potential databank that contains invaluable information on human capital profiles and their skill sets could be identified through hashtags. Such data processed by AI may be worthwhile in matching the needs of job seekers and recruiters. Platform features may be upgraded to support subscriptions based on the skill sets' hashtags. Subscription hashtags would benefit many small- and medium-sized organizations with limited resources to hire, develop, and retain

full-time employees given that their actual manpower needs are lower. For example, a small nonprofit that runs a bi-annual charitable event may find the fundraising hashtag useful to identify a short-term project contractor with the desired experience and skills to run the event on a seasonal basis.

*Physical infrastructure*

The aspect of physical infrastructure also needs to be adjusted to align with new ways of working, just as with the aspects of human capital and technology. Urbanization will help shape diverse work patterns in the future since more residents will move into less established neighborhoods. Some of the more established areas will likely be gentrified to reflect new demands from populations. Nonetheless, the areas will reflect the inhabitants' identities. For instance, more expats are priced out of the inner CBD areas i.e. Lumpini and mid-Sukhumvit which become more unaffordable. They have migrated into the less known albeit more cost-friendly areas like Phrakanong, it has brought about many changes to the locals and resulted in many enterprises and business opportunities that sprung up as a result (Freshbangkok.com, 2019).

Not only that many areas have been gentrified to reflect altered demands of professionals and residents alike, the office rentals sector has adjusted to the changing needs and patterns of use as well. Many office rental spaces have become more flexibly designed to cater diverse needs. Many co-working areas have been developed to be shared amongst remote workers given that more workers continue to engage in work across time zones. This concept may be juxtaposed with restaurant spaces that serve as typical diners during the day and are turned into full bar services after hours. Hence, office spaces that have been idle during the night could be utilized to serve more users. This will help generate additional cash flows to the renters provided that they manage their costs e.g. electricity and manpower effectively.

Therefore, it is inevitable that modern offices should possess high flexibility and could be well adjusted to suit the targeted users' needs and preferences. Co-working space is a well-praised practice that could be thought of as a key driver for cost savings or income-generating models in order to optimize resources per the economic demand and supply rules. Furthermore, employees should be empowered to select the flexible patterns that suit their working and living preferences and conditions. They may determine

the number of days in a given week to work on-site and off-site. Meetings could be arranged in both face-to-face and remote formats tailored to the needs of staff, provided that the quality of work is not affected at both individual and team levels.

Therefore, urban administrators have a significant role in catering to the foreseeable growth in the demand for remote shared offices, ideally round-the-clock 24 hour spaces. These spaces should be dispersed like a clustered mini CBD across populated areas of the city. The derived benefits include a reduction in the time and expenses spent as well as the psychological stresses encountered during the commute (Giovanis, 2018). After all, such a facilitative infrastructure would allow organizational members to remain effective in carrying out tasks at remote locations and eliminate prior limitations so they could have a better quality of life and work outcomes.

Public service is another critical driver for flexible work arrangements. For instance, the public transportation system not only provides services to day travelers but also commuters who may work night shifts or flexible hours. The system may have to adjust the schedule to operate 24-hours with more frequent trips offered to night commuters. Global metropolises such as New York have provided public transportation services to serve the needs of their urban residents. Train trip frequencies may be adjusted to suit the actual demands of the night commuters, yet they remain operating throughout the night without compromising the standardized level of services.

Security emerges as another main concern for many night shifters, especially female workers who have to commute to work during late hours. Public transport options may enhance its security with more eclectic surveillance cameras as well as placing more staff on site. The municipality should also prepare to set up brighter night lights from the main streets that lead up to smaller alleyways so that those who travel feel safe on their way. Public authorities shall survey the residential areas and request budgets to upgrade public infrastructure so that people have less worries about how they get to and from work.

Furthermore, policymakers should facilitate other relevant services that will support night shifters. Food deliveries and night diners should be encouraged to operate across geographical locations, particularly during the night hours, so that employees are less concerned about the availability of meals. Diners in countries like Japan have started

to operate during the night and extend their service hours into late hours. In some cases, the restaurants operate with the least amount of manpower given the technological advancements. Robots are used to greet customers and hand queues. Orders are taken through automatic tablet devices that are sent straight to the kitchen. As stated, humans are still required on-site to govern and administer the automated systems and robots. They have the edge over these machines in that they are able to recognize and make sense of complex human needs as well as being able to notice customers' emotions and respond to them in a more empathetic and meaningful manner.

Real estate development is another area that may support flexible work trends. Developers have been cognizant of the demographic and technological changes over the years and the new normals that come with them. They need to analyze the rapid changes in the behaviors of the residents that resulted in more flexible working and living conditions. Such trends, popular with the younger generations, include startups and freelancing, which could utilize remote workspaces that offer a decent balance between living and working. As such, many projects have upgraded regular library or sitting areas into vibrant co-working and meeting spaces that capture the preferred modes of work for younger clients, from night-owl tutors to freelancers. Some spaces even provide live broadcasting stations or corners specifically designed to cater to ecommerce influencers, including YouTubers, TikTokers, or Facebook Live. Nonetheless, the facilities should remain strictly operated under social distancing and hygienic measures issued by the public authorities and the estate during the pandemic. Modern office spaces thus provide flexible operating hours together with facilities and necessary office equipment such as automated photocopying services to substitute normal office space and set the real estate development standards that support future workers who may opt to work remotely from anywhere.

*Social and cultural dimension*

Moreover, modern workplaces should not overlook the importance of the sociocultural dimension. Flexible work arrangements must not diminish the importance of human interactions in traditional workplace settings.Shared spaces should be designed to promote interactions amongst workers, such as the use of virtual coffee break corners that support the sharing of diverse ideas. They also foster a community of

practice that in turn unleashes the potential for knowledge transfer within the shared space (Bouncken & Reuschl, 2018). Such a sociocultural dimension provided the consolidated basis for integration of all realms, starting by promoting the right culture that fosters skills and competencies development, while yielding benefits from the external environment, ideally the supportive infrastructure. Therefore, it is proposed that all these aspects will need to be strategically integrated and yield resources to tackle the adaptive ways of working.

Organizational socialization is the process by which new employees learn the attitudes, actions, and information they require to participate as organizational members (Van Maanen & Schein, 1979). The employees thus learn about the organizational culture and pass their knowledge onto others. When they are not working at the office, they are more distant from their peers which may limit the degree to which they engage in socialization process with others. Therefore, HR shall develop strategies on how to keep their employees engaged given that virtual technologies allow them to remain connected.

Many staff also expressed WFH fatigue, a state in which remote workers are unmotivated, disconnected, and unsatisfied with their working environment which may eventually lead to burnout, according to the survey conducted by www.teambuilding.com (2021). One of the most common causes of such state is loneliness. Many remote workers concentrate on their work and only have a few unproductive chats with colleagues which may result in a sense of separation from peers. Remote team members have less opportunity to develop natural connections with coworkers and HR needs to counter that by offering the opportunities to interact and connect.

Gibson et al. (2003) defined stress as *"An adaptive response, mediated by individual differences that is a consequent of any action, situation, or event that places special demands on a person"*. A stressor is a potentially threatening external situation and stress is a result of handling things that place extra demands on people. Outcomes of stress range from behavioral and cognitive including but not limited to, dissatisfaction, absence, frustration and burnout. In the organizational context, this may lead up to turnover. Unsurprisingly, employees may experience stress during their WFH and may need assistance in managing stress levels.

HR may reach out to remote employees and offer them guidance in navigating WFH with the aim to provide them necessary support to cope with its impact. The support may range from assigning team members to conduct regular check-ins with others, to establishing hot-line or communicating platforms that offer prompt response in providing guidance. The essence lies upon understanding the needs of employees who may experience a high degree of separation from their colleagues, and keeping up with employees' state of emotions in order to address the lack of psychological needs. Leadership should direct organizational resources toward building effective virtual organizational culture so that employees' psychological needs are fulfilled and that social capital is embraced and valued during the pandemic (Huvanandana, 2022).

That said, a virtual workplace could utilize informal spaces set aside for colleagues to mingle and socialize. Ideas may be shared through collaboration in the virtual space. HR should also promote team building strategies that include virtual activities among colleagues so that they remain engaged with others on a regular basis i.e. Team building Tuesday on Teams in which games and fun events may be incorporated allowing colleagues to play together so that they could build and maintain good working relationships. Virtual organizational culture may be different from the usual corporate culture but it may become the norm in the future. As troops of younger generations have started to take over the workplace, it becomes apparent that these digital natives would likely be more comfortable in navigating the virtual workplace and its evolving culture. Such dynamics of a digital-infused workplace have indicated the importance of adaptability amidst uncertain situations of the VUCA era and beyond.

Many corporate events could be organized on a virtual basis for instance, corporate social responsibility (CSR) programs. There are many ways of doing good while being online as opposed to the usual onsite participation. Staff could book a slot to read for the blinds or they can co-create online public awareness campaigns on their causes of choice. The important thing to consider is that they come and work together so that they do not feel isolated and disconnected.

Based on the motives of employees, HR may seek to deploy reward strategies that capture their interests. As such, incentives may be given to those who participate in the virtual initiatives such as additional paid vacation leaves or extra benefits coupons

for redemption. Given that there is a trend of intergenerational employees in one workplace, HR needs to consider options that suit each category of workers. Different generations may prefer distinctive sets of reward that reflect their wants and tailored to their specific needs.

## Conclusion

The future of work will involve a high degree of uncertainty, given the external disruptive forces and circumstances as in the VUCA business environment, as well as the prolonged effects of the pandemic. Changes to many circumstances have led many workers to reflect upon how their future workplace would become. Although it may not be possible to determine the exact scenarios on the future state of work, workers should prepare to adapt and adjust to forces of change. Key decision makers will discuss potential implications of how HR practitioners and policy implementers will actually adapt their business-as-usual around the new working arrangements in an attempt to predict the future state of work circumstances. These "how to" aspects would allow relevant personnel to get their job done while preparing to carry out further measures as necessary. Such innovative ways to adjust to such flexible work arrangements include the introduction of virtual dashboards to promote data utilization amongst virtual team members. Others include the virtual coffee hours that may replace informal meet-up sessions such as water cooler moments or after-hour parties. Strong emphasis will be placed on encouraging interactions and participation among colleagues, which may be lost during the pandemic because most employees are still operating from their private territories.

Remote work and flexible work arrangements have been sought as an optional solution to address the future of work and result in rapid changes that likely require strategy reformulations. This article deliberately outlines several critical dimensions that HR and decision makers need to be cognizant of and handle tactically. The emphasized areas are also interrelated as they focus on the internal human capital's skills and knowledge as well as guiding external support from the infrastructure. Without adapting to each of the elements and integrating them altogether to suit the future work trends, the organization would likely miss the opportunities to elevate their capabilities to cope with changes and adapt to new normals and practices while continuing to serve the diversity

of stakeholders' needs. As a result, policymakers and stakeholders must truly understand the organizational contexts as well as the external environment in order to determine how they should approach human capital, work, and its evolving prospects in ways that optimize resource allocations while retaining employees' work motivations, which will contribute to long-term organizational success.

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# Roadmaps for Developing Thai Public Agencies Towards the Inspiration Level of the Sufficiency Economy Philosophy

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## Abstract

This research investigates roadmaps for developing Thai public agencies to operate based on the Sufficiency Economy Philosophy. Primary and secondary data are collected from two government departments under the Ministry of Agriculture and Cooperatives using a triangulation approach. Primary data was obtained from in-depth interviews of top management and focus-group discussions among middle management. A systematic analysis was conducted using content analysis and descriptive statistics. Assessments of public administration based on the Sufficiency Economy Philosophy were conducted and the results revealed some aspects of the Sufficiency Economy levels. To ensure that the administration of public agencies based on the Sufficiency Economy Philosophy will progress towards the inspiration (the top) level of the Sufficiency Economy, roadmaps recommendations are proposed.

**Keywords**: Sufficiency Economy Philosophy, Thai Public Administration, Roadmaps

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# แผนที่นำทางในการพัฒนาหน่วยงานราชการไทยสู่ระดับสูงสุดของการประยุกต์ใช้หลักปรัชญาของเศรษฐกิจพอเพียง

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## บทคัดย่อ

งานวิจัยนี้เป็นค้นคว้าแผนที่นำทางในการพัฒนาหน่วยงานราชการไทยเพื่อให้สามารถดำเนินงานบนพื้นฐานหลักปรัชญาของเศรษฐกิจพอเพียง ผู้วิจัยได้ทำการเก็บรวบรวมข้อมูลปฐมภูมิและทุติยภูมิจากกรมในสังกัดกระทรวงเกษตรและสหกรณ์มา 2 กรม โดยใช้แนวทางสามเส้า สำหรับข้อมูลปฐมภูมิได้รวบรวมจากการสัมภาษณ์เชิงลึกของผู้บริหารระดับสูงและการสนทนากลุ่มในกลุ่มผู้บริหารระดับกลาง หลังจากนั้นได้วิเคราะห์ข้อมูลทั้งหมดด้วยวิธีการวิเคราะห์เนื้อหาและสถิติเชิงพรรณนา การประเมินการบริหารราชการตามหลักปรัชญาของเศรษฐกิจพอเพียงสะท้อนให้เห็นถึงการปรับประยุกต์ใช้หลักปรัชญาของเศรษฐกิจพอเพียงในบางแง่มุม จากผลการประเมินข้างต้น ผู้วิจัยได้นำเสนอแผนที่นำทางในการพัฒนาของกรมทั้งสอง เพื่อให้การบริหารราชการบนพื้นฐานหลักปรัชญาของเศรษฐกิจพอเพียงนั้นสามารถก้าวสู่ระดับสูงสุดของความเป็นเศรษฐกิจพอเพียงได้ในที่สุด

**คำสำคัญ**: หลักปรัชญาของเศรษฐกิจพอเพียง การบริหารราชการไทย แผนที่นำทาง

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## 1. Introduction

The Sufficiency Economy Philosophy (SEP) was developed by His Majesty King Bhumibol Adulyadej The Great. His Majesty provided guidance on appropriate conduct and pointed out the way to develop a more resilient and sustainable economy that is better able to meet emerging challenges such as globalization (Thailand International Cooperation Agency, 2021). The Sufficiency Economy Concept and Philosophy are determined as the guiding principle to be adopted in the 9th -13th National Economic and Social Development Plans (2002-2026), and the 20-Year National Strategy (2018-2037), (National Economic and Social Development Board, 2002; Office of the National Economic and Social Development Council, 2018).

Thailand was one of the 189 countries that joined the international community in endorsing the United Nations Millennium Declaration. Thailand also started the Millennium Development Goals (MDG +) initiative, which added additional goals and targets, to reflect its strong commitment to development by focusing on more precise and clear targets. Once the MDGs were concluded in the year 2015, the United Nations created the Sustainable Development Goals (SDGs). The Sustainable Development Goals (SDGs) have an emphasis that is different from the Millennium Development Goals (MDGs). While the MDGs was a starting point in global efforts to enhance the standard of living and well-being of the people, all 17 SDGs focus on promoting and nurturing participation, either directly or indirectly, of the international community at all levels. (Thailand International Cooperation Agency, 2021)

The 17 Sustainable Development Goals (SDGs) that were formally adopted by 193 United Nations member states in 2015 represent an ambitious set of global aspirations for the next fifteen years. A planetary emergency and the coronavirus disease (COVID-19) pandemic escalate changes in the landscape of development and complex issues regarding the environment, economy, and society. As a result, it is estimated that up to 1 billion people could be living in extreme poverty by 2030 (United Nations Development Programme, 2021). The situation becomes an opportunity for the world to push toward the Sustainable Development Goals. To achieve the goals, organizations around the world should adopt a sustainable business model (UN Global Compact, 2022) along with the development and delivery of technologies and solutions. To achieve

the organization's potential to reduce risk, improve productivity, drive growth, and create shared value, sustainability must be integrated across the organization. It's needed to stimulate coordination, learning, collaboration, and greater innovation, all leading indicators of healthy, thriving businesses in the 21st century. In addition, to achieve a business's potential, strategic and operational integration must consider the uniqueness of the organization and its components in terms of culture, identity, and strengths. These factors can either be barriers or amplifiers of executing strategy. The roadmap provides guidance on how to integrate sustainability-related goals and strategies across the organization (UN Global Compact, 2022).

It could be stated that the Sufficiency Economy Philosophy (SEP) focuses on development that is thorough and multifaceted as well as holistic and inclusive of the societal, economic, environmental, and cultural dimensions. The SEP can be applied to every sector by delving deep into the information in a systematic way and achieving the correct understanding. (Thailand International Cooperation Agency, 2021). A study by Mongsawad (2010) shows that the philosophy of sufficiency economy brings a new theory in addressing development challenges including issues of environmental sustainability, human capital, institutions, and the role of government. The philosophy aims at improving human well-being as a development goal which can be considered a new paradigm of development. This research aims to assess the current situation of application of the Sufficiency Economy Philosophy (SEP) to the performance of two government departments from the Ministry of Agriculture and Cooperatives. In addition, ensuring the administration of public agencies based on the SEP will be driven towards the inspiration (the top) level of the Sufficiency Economy, roadmap recommendations are proposed.

## 2. Literature Review

### 2.1 The Sufficiency Economy Philosophy, the Three Levels of the Philosophy, and Its Importance in Thailand

#### Definition and the Model from the Global Perspective

The Sufficiency Economy Philosophy (SEP) is a set of guidelines towards a healthier, more prosperous, more sustainable, and happier future nation (Avery & Bergsteiner, 2016). It covers perspectives on social, economic, environmental, and cultural. Merlin-Scholtes

(2007) stated that *"Like human development, the Sufficiency Economy Philosophy places humanity at the center, focuses on well-being rather than wealth, makes sustainability the very core of thinking, understands the need for human security and concentrates on building people's capabilities to develop their potential. And it adds a spiritual dimension to human development, reflecting the King's own character, convictions, and sincerity"*. On November 29, 1999, extracts of H.M. the late King Bhumibol Adulyadej's speeches and other related remarks on sufficiency economy were compiled as an approach for all to adopt (Foundation of Virtuous Youth, 2017). According to the extracts, SEP is based on the Buddhist middle path, which aims for balance in life and practices. The philosophy can be considered as a guiding principle for people at all levels of society i.e., from the individual to a borderless society, either in the private or public sectors (Bergsteiner & Dharmapiya, 2016). In the case of the public sector, SEP can be adopted in practices by management with a macroeconomic perspective, in policy design, and alternative development strategies (Wibulswasdi et al., 2012).

**The Three Levels of the Philosophy**

To evaluate the adoption of SEP, Puntasen (2017) introduces the 3-level framework of SEP to explain the differences between levels of practice: *compliance, comprehension,* and *inspiration*. Based on the systematic model of SEP introduced by Bergsteiner and Dharmapiya (2016), Sathirathai and Towprayoon (2016) connect each level of SEP adoption with its related behavior.

At the *compliance* level, people partially adopt SEP to avoid risks that could harm them. At this first level, people may receive recommendations and guidance from their superior. However, they may be selective and comply with only some of the recommendations as a minimum for survival. People start to gain self-reliance as a partial outcome. Progression to the level of adopting SEP would come to those who reach the comprehension level. At this level, people start to adopt SEP logically, with understanding. Puntasen (2017) explains that people at this level reflect more on their way of thinking, which becomes aligned with SEP. Cognitive skills such as analytical, critical, and creative thinking would improve one's ability to survive and bounce back from crises. As a result, the outcome of self-reliance would shift upwards to a state of resilience (Sathirathai & Towprayoon, 2016). Finally, people would reach the highest level of

*Inspiration* once they have fully adopted SEP: this is the level of enlightened practice. Work principles would be continuously followed along the lines of a fully developed sufficiency mindset and embedded virtues and knowledge. Therefore, this combination of practice and beliefs would become a way of life, which would move the individual from being self-focused to being other-oriented. Creativity and the ability to innovate would also be beneficial to people at this stage, since the values thus generated could be transferred to the owner of that innovation as well as to others (Jenjarrussakul, 2017). Therefore, with the development of SEP-based practices and the generated values, people at this level would be inspired and enjoy sharing their happiness with others. As a result, all the expected outcomes from the full adoption of SEP could be achieved.

**The Importance of Sufficiency Economy Philosophy in Thailand**

SEP was introduced as the "*guiding philosophy of national development*" in the Ninth National Economic and Social Development Plan (NESDP) (2002-2006) due to the situation which was described as "*[...] over the past four decades clearly indicates imbalanced development. While success measured in terms of quantitative indicators has been achieved, improvements in the quality of life seem to lag far behind*" (National Economic and Social Development Board, 2002). The above situation was a result of the implementation of the first to eighth NESDPs in which only the expansion and success of the national economy were emphasized in the country's development. Rising land prices, higher investment from foreign investors, and higher GDP were used as signals which helped to prove the success of this policy (Puntasen, 2017). To continuously enhance the quality of life of people in Thailand, SEP has been embedded since then.

Since 2017, Thailand has been operating under the 12$^{th}$ NESDP (2017-2021). In this NESDP, SEP as a guiding principle to achieve the main goal of "Security, Prosperity, and Sustainability" in the rapidly changing and integrated world (National Economic and Social Development Board, 2016). It is comprised of flagship projects with implementation objectives that aim to prepare human capital, society, and the economy to serve the goals specified in the National Strategy. The implementation of the 12$^{th}$ NESDP is likely to fall short of expectations, as the country continues to grapple with the spread of COVID-19. The 13$^{th}$ NESDP, which will run from 2023 to 2027, aims to transform the country in five key areas: narrowing income disparities and poverty reduction through innovation; creating

a knowledge-based economy and value-added development; human resource development to meet demand in a digital economy; environmental conservation to deal with climate change; and advanced preparations to deal with changing global economic and social environments. The 13th Plan is expected to combine sufficiency economy concepts; the United Nations' Sustainable Creation Goals; the bio-, circular, and green economic models; and the 20-year national strategy plan in its development (National Economic and Social Development Board, 2021).

The National Strategy (2018-2037) is the country's first national long-term strategy developed pursuant to the Constitution. The country's vision is stated to become "a developed country with security, prosperity, and sustainability in accordance with the Sufficiency Economy Philosophy" with the goal being all Thai people's happiness and well-being. To evaluate the success of the National Strategy, six groups of indicators are used. The indicators cover government efficiency and better access to public services. The Strategy on Public Sector Rebalancing and Development aims to reform and enhance the country's governmental administrative services. The ultimate goal of the strategy includes the development of government agencies to be open to intersectoral operations among relevant parties. Furthermore, it also aims at ensuring quick responses to public needs and transparency (Office of the National Economic and Social Development Council, 2018). To achieve the goal of being a "sustainable national development according to good governance principles" (Institute for Population and Social Research, 2017) and to synchronize with the NESDP, SEP is used as a core principle in this strategy (Department of International Organizations, Ministry of Foreign Affairs of Thailand, 2018). Therefore, SEP plays a crucial part in national development in Thailand.

### 2.2 A Roadmap to Reach the Desired Outcome

According to Cambridge Dictionary (n.d.), a roadmap is "a plan for how to achieve something." It guides stakeholders to reach the desired outcome step-by-step, as well as provides supportive information behind the plan (Chisel, 2021; CIO Wiki, 2021). Forecasting and backcasting represent two major approaches to support planning and decision-making. Broman & Robert (2017) state that forecasting presents trends into the future and is often used in attempts to predict and solve problems. But it fails when the dominating trends are themselves the main part of the problem. The other way to solve this problem

is using backcasting, begins by defining the vision, and then asks: what shall we do today and subsequently to get there (Robert, 2000)? Broman et al. (2013) propose that forecasting should be used as a supplement in an explorative way with backcasting approach, especially in the sustainability context. To deliver sustainable design practices in the industry, Faludi et al. (2020) formulated a roadmap using the "backcasting" methodology. The roadmap starts with a vision, compares it to the current reality (the baseline), ideates solutions, and chooses a path forward (the roadmap). While the overall goal is to transform the industry, the roadmap can aim at the design community to turn visions of sustainability into reality.

## 3. Research Methodology

### 3.1 The Assessment Model of Sufficiency Economy for Public Agencies

Jenjarrussakul and Senasu (2022) develop an assessment model reflecting levels of applications of Sufficiency Economy Philosophy for public agencies which are based on Bergsteiner and Dharmapiya (2016), Sathirathai and Towprayoon (2016), and Puntasen (2017). This model has four dimensions based on system analysis. The first three dimensions aim at investigating evidence that reflects the existence of inputs, processes, and outputs. The fourth dimension assesses the existence of outputs/outcomes/impacts from the application of SEP in each agency. Additionally, there are two evaluation factors for each dimension. Each evaluation factor has three levels of intensity of application of SEP: compliance, comprehension, and inspiration. The basic level, called "Compliance (Partial Practice)", refers to an agency that exhibits sustainability which focuses on performing work with prudence. The second level, called "Comprehension (Advanced Practice)", refers to an agency that demonstrates happiness, which is reflected in prudence and moderation. Finally, the top-level, called "Inspiration (Enlightened Practice)", refers to an agency that exhibits intended giving benefits to society that is based on reasonableness. Therefore, the two evaluation factors for each dimension are the criteria used to assess the existence of adoption of SEP and the proper implementation for each dimension at different levels. Figure 1 illustrates three levels of the assessment criteria of the Sufficiency Economy.

The first level - the outermost circle - is “Compliance” which reflects a sustainable organization. The middle circle is “Comprehension”. The highest level - the innermost circle - is “Inspiration”. Shown in each circle are the keywords of each dimension of the assessment reflecting means, methods of thinking, and norms of public administration as used in each level of the concept of the SEP.


**Figure 1:** Assessment Model of the Sufficiency Economy for Public Agencies (Jenjarrussakul & Senasu, 2022)

### 3.2 Data Collection and Analysis

The participants in in-depth interviews were top management and participants in focus-group discussions were middle management from two departments of the Ministry of Agriculture and Cooperatives (MOAC); i.e., the Department of Royal Rainmaking and Agricultural Aviation, and the Land Development Department. These two departments are purposively selected because of revealing top assessment scores among eight sampling departments in Senasu and Jenjarrussakul (2019)’s study. Therefore, they are interesting as examples of best practices in applying the Sufficiency Economy Philosophy.

Triangulation of observers and sources of data was adopted to collect primary and secondary data in this qualitative research (Bryman, 2016, p. 386). When we collected

primary data from in-depth interviews, and focus group discussions, at least three observers attended. During the interviews, note-taking and tape-recording techniques, where permitted, were employed to record observations and responses to interview questions. Probes and document analysis were used to explore interview answers in more depth (Hussey & Hussey, 1997). The content analysis was conducted in phases (Duriau et al., 2007). Firstly, the recordings were transcribed and coded. After that, an analysis of content and interpretation were conducted. The triangulation of analysts was used to enhance the trustworthiness of the results. Backcasting methodology is adopted to formulate the roadmap, which starts with a strategic goal, compares it to the current reality (the assessment result), ideates solutions, and chooses a path forward, i.e., the roadmap (Broman & Robert, 2017).

## 4. Results

In this section, we elaborate on two case studies, i.e., the Department of Rainmaking and Agriculture Aviation and Land Development Department, by briefing the department context, sufficiency economy assessment result, and roadmaps towards the inspiration level of the sufficiency economy model.

### 4.1 Department of Rainmaking and Agricultural Aviation

The Department of Royal Rainmaking and Agricultural Aviation was founded in 2013. The aim of the establishment was to expedite operations of the Royal Rainmaking Project and to promote cooperation with other government sections in response to integrated duties. (Department of Rainmaking and Agricultural Aviation, 2022a)

**Mission**

1. Management of atmospheric water to create and distribute rainfall for the integrated development of agriculture, water resources management, forest conservation and rehabilitation as well as natural disaster reduction.

2. Research and development of rainmaking technology to enhance efficiency of weather modification and atmospheric water management for disaster reduction resulting from weather divergence and climate change.

3. Aviation management for rainmaking, research, and development as well as agricultural activities. (Department of Rainmaking and Agricultural Aviation, 2022b)

**The Sufficiency Economy (SE) Assessment Results** (Senasu & Jenjarrussakul, 2019)

The SE assessment results of the Department of Royal Rainmaking and Agricultural Aviation is at the compliance (partial practice) level which reflects a sustainable organization that engages employees in planning, has systematic and transparent management, training for employees so that they are capable of performing their duties, embeds ethics and morals in employees, and is an organization with prudence, immunity, and ability to respond to changes. Details are as in Table 1. It can be said that the outstanding characteristics of this department are competent staff with social responsibility behavior and networking with other agencies in related fields. However, as staff have to work every day for 8 months during the rain-making period (March–October), they are exhausted and have a low quality of work life. For the 4$^{th}$ dimension - "Benefits to organization and society" - the department should develop and strengthen global networking in the exchange and sharing of knowledge, technology, and practices of rainmaking. These should be the goals or desired outcomes for the department when developing strategic plans for its roadmap. Note that the field in grey means the department has no significant evidence according to the criteria. Table 2 shows roadmaps for the Application of Sufficiency Economy for the Department of Rainmaking and Agricultural Aviation to improve their performance to the highest level of the SE model. The department needs to improve the 3$^{rd}$ and 4$^{th}$ dimensions. Figure 2 illustrates the application of sufficiency economy assessment for the department.

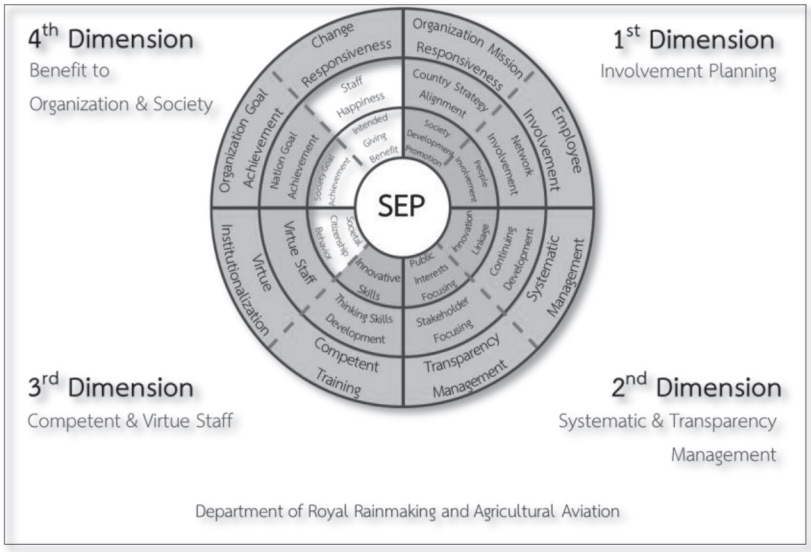


**Figure 2:** Assessment of Application of Sufficiency Economy by the Department of Rainmaking and Agricultural Aviation

*Note*: Factors shown in white need improvement.

**Table 1:** Assessment of Application of the Sufficiency Economy by the Department of Rainmaking and Agricultural Aviation

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** |
| 1st dimension | 1. There is planning in response to an organization's vision, mission, and strategy (departments and ministries). | Mission goal formulation is aligned with the ministry's goals. | 1. Organization's strategy is aligned with the national strategy. | Vision and long-term plans are clearly stated. | 1. There are policy and strategic plans that support or promote social development or humanity. | Some strategic plans have significant impact. For example, water management against drought, plan against wildfire, and plan regarding climate change, etc. |
| Involvement planning | 2. Strategic planning includes communication where understanding is forged, and employees' participation developed. | There are meetings to hear staff's ideas. Staff's ideas are added in planning process. | 2. In strategic planning, there are briefings, discussions, and involvement of stakeholders or networking. | Relevant stakeholders are invited to participate in the planning process. | 2. In strategic planning, there is public involvement. | Developed communication channels (i.e. TV, website, and social media) to receive input and disseminate information.<br>- Open data and public hearing for an action plan. |

**Table 1:** Assessment of Application of the Sufficiency Economy by the Department of Rainmaking and Agricultural Aviation (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices |
| 2nd dimension<br><br>Systematic and transparent management | 1. Systematic management enhances efficiency at work. | There is a guideline based on information to plan daily missions. Also, there is communication of information to help team members keep abreast of progress. | Continuing development of management. | There are daily and annual summaries to help improve performance. | 1. Management innovation to create benefit to network and people. | - There is application of new technology and research to improve efficiency in performance and services.<br>- Mobile application regarding water demands map. |
| | 2. Transparent management with policies, measures, monitoring system, and information disclosure. | There is a policy to oversee the direction of the organization which calls for brainstorming by the staff. | Management by focusing on customer and stakeholder. | Think of end results for people's benefit, based on the highest utilization of human resource management. | 2. Create network involvement, and aim for people and stakeholders' self-reliance. | There are trainings to develop volunteers to support the department's operation and play a measured role in operations. |

**Table 1:** Assessment of Application of the Sufficiency Economy by the Department of Rainmaking and Agricultural Aviation (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** |
| 3rd dimension<br>Competent and virtuous staff | 1. Enhancement of skills and knowledge related to tasks for which they are responsible. | There are various methods for developing staff's knowledge and skills, both theoretical and hands-on tools. | 1. Staff Development in analytical thinking, critical thinking, and creative thinking. | There is encouragement in research development, and upgrading assignment presentations based on necessary information. | 1. Staff are capable of creativity and innovation development. | - Have made effort to search for and develop technology to increase work efficiency. For example, the development of a mobile application (water demands map).<br>- There is a policy to study and develop creative thinking from other agencies' research. |
| | 2. Institutionalization of morals and ethics for staff. | There are varied activities to promote good relationships among staff and to develop their morals and ethics | 2. Staff could have moral and ethical livings, both in work life and personal life. | - Top management employs good leadership to encourage and motivate desired staff behavior.<br>- Existence of No Gift Policy.<br>- No complaint about corruption. | 2. Staff are moral and ethical and are role models for others in society. | |

**Table 1:** Assessment of Application of the Sufficiency Economy by the Department of Rainmaking and Agricultural Aviation (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** |
| 4th dimension<br>Benefits to organization and society | 1. Work performance of agencies to achieve the organization's mission and objectives. | Annual performance rating is above goals. | 1. Work performance of agencies to achieve the national strategy. | There are some achievements aligned with the national strategy. | 1. Work performance of agencies has an impact on society and humanity. | |
| | 2. Organization's ability to face or respond to changes. | - There are active solutions and action plans which cover 19 core challenges, including daily problems of staff shortage, fieldwork, and collaboration between agencies and volunteers in the area.<br>- An implementation of risk management. | 2. Ability to create happiness and a quality workplace for all employees. | | 2. Intention to give benefits to society and humanity. | |

**Table 2:** Roadmaps for Application of Sufficiency Economy in the Department of Rainmaking and Agricultural Aviation

| Strategic goals | Goal Deadline | Status* 2022 | SE level | Measures |
|---|---|---|---|---|
| **Quality of Work-life and Happiness** | | | Comprehension | Improve happiness and quality of work-life for staff. |
| Manage working hours for staff to have a weekly holiday. | 2023 | | 4th dimension, 2nd assessment factor | At least one day leave per week during the 8 months rainmaking period (March–October). |
| Adjust procedures for ensuring guidelines for dealing with quality of work-life. | 2023 | | 4th dimension, 2nd assessment factor | Working procedures for ensuring both efficiency and staff engagement. |
| Manage job transfer and job rotation to support staff needs and career development. | 2023 | | 4th dimension, 2nd assessment factor | - Manual of career development.<br>- Enhance flexibility of job transfer and job rotation. |
| Design and implement a happy workplace project. | 2023 | | 4th dimension, 2nd assessment factor | A higher level of staff happiness. |
| **Virtuous and ethical way of life** | | | Inspiration | Staff have virtue and ethical way of life and would be inspired as role models for others. |
| Develop ecosystem for virtuous and ethical workplace. | 2024 | | 3rd dimension, 2nd assessment factor | A project of intended giving benefit supported by top management. |
| Staff behave with a fully developed sufficiency mindset with embedded virtues and knowledge. | 2024 | | 3rd dimension, 2nd assessment factor | Regular sufficiency economy dialog in accordance with the current Intended Giving Benefit (IGB) or Corporate Social Responsibility (CSR) Guideline. |

**Table 2:** Roadmaps for Application of Sufficiency Economy in the Department of Rainmaking and Agricultural Aviation (Cont.)

| Strategic goals | Goal Deadline | Status* 2022 | SE level | Measures |
|---|---|---|---|---|
| Staff move from being self-focused to being other-oriented. | 2024 | | 3rd dimension, 2nd assessment factor | Activities of intended giving benefit. |
| **Impact of performance on society or humanity** | | | Inspiration | Work performance of the department has an impact on society or humanity. |
| Eco-friendly drive: Develop a product or initiate a process to increase environmentally friendly drive and effectiveness. | 2025 | | 4th dimension, 1st assessment factor | Optimization and new development of products/processes for environmentally friendly rainmaking. |
| Anchoring sustainability aspects in the strategic goals of the department and their integration in strategic management decisions. | 2025 | | 4th dimension, 1st assessment factor | Expansion of participation in sustainable development goals. |
| **Sustainable Happiness Society** | | | Inspiration | Intended to give benefits to people and society. |
| Realize transparent society citizenship and integrate it within specific divisions. | 2025 | | 4th dimension, 2nd assessment factor | - Standardization and comprehensive establishment of global relationship management<br>- Continuous support of society's citizenship behavior. |
| Deepening of a global partnership concept to provide sustainable solutions. | 2025 | | 4th dimension, 2nd assessment factor | Introduction of a partnership concept that is globally applicable for international networking. |

*Note*: Status could be in progress, partially achieved, or achieved

**4.2 Land Development Department**

The Land Development Department (LDD) was established under the purview of the Ministry of National Development in 1963. In 1972, the government dissolved the Ministry of National Development and restructured administration, and the Land Development Department was transferred to the Ministry of Agriculture and Cooperatives. The Land Development Department has the duty to conduct soil surveys and analyses. The results of surveys and analyses form the basis for establishing land classification and utilization maps, developing land, and defining land use areas as well as soil and water conservation areas. Under the Act, the Land Development Department is responsible for the collection of statistics as a basis for conducting land censuses. (Land Development Department, 2022)

**The Sufficiency Economy (SE) assessment results** (Senasu & Jenjarrussakul, 2019)

The SE assessment results of the Land Development Department are also at the compliance (partial practice) level which reflects a sustainable organization that engages employees in planning, has systematic and transparent management, training for employees so that they can perform their duties, embeds ethics and morals in employees, and is an organization with prudence, immunity, and ability to respond to changes. Additionally, the department is a happy organization that allows employees in the organization to participate in planning, has systematic and transparent management, and trains employees to enhance their capability for work. However, there are some shortcomings in performance, i.e., employee training is needed to increase the staff's ability to be creative and to innovate as well as to instill an awareness of ethics and morals and to act as a role model for society. In addition, for the 4$^{th}$ dimension of "Benefits to organization and society", the department should focus more effort in presenting clear evidence of the benefits to people at both the national and international levels.

Table 3 shows the application of the sufficiency economy assessment of the Land Development Department and table 4 demonstrates roadmaps of the application of Sufficiency Economy for the department, which aim to improve the 3$^{rd}$ dimension, 2$^{nd}$ factor at comprehension level, 3$^{rd}$ and 4$^{th}$ dimensions of both factors at comprehension

and inspiration levels. Figure 3 illustrates the application of sufficiency economy assessment for the department.

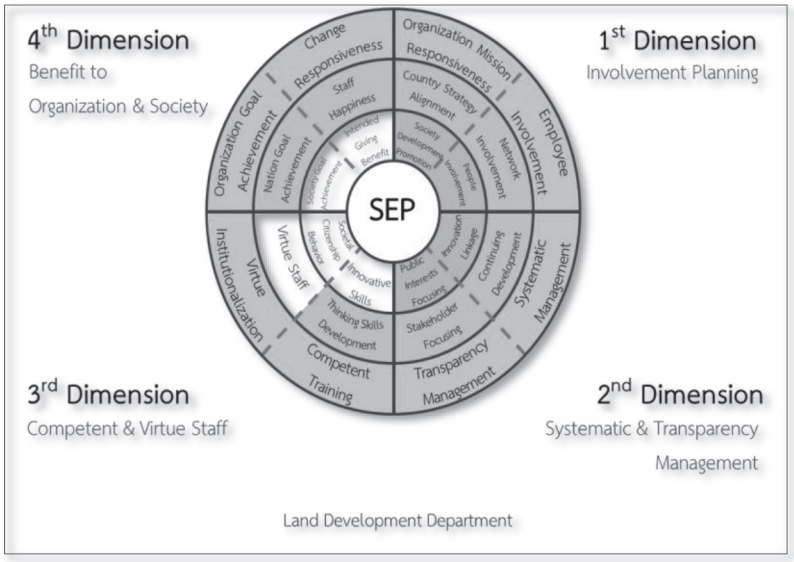


**Figure 3:** Assessment of Application of Sufficiency Economy by Land Development Department
*Note*: Factors in white need improvement.

**Table 3:** Assessment of Application of the Sufficiency Economy by the Land Development Department

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** | **Assessment Factors** | **Department's Practices** |
| 1st dimension | 1. Public administration with planned response to an organization's vision, mission, and strategy (departments and ministries). | There is mission goal formulation aligned with the ministry's goals and the department has a core function in supporting the royal projects. | 1. Organization's strategy is aligned with the national strategy. | The strategic formulation is aligned with the national strategy and Sustainable Development Goals (SDGs). | 1. There are policy and strategic plans that support or promote social development or humanity. | - There are strategic policies aligning government policy in organic agriculture and environment-friendly agriculture.<br>- Building awareness of food safety for farmers. |
| Involvement planning | 2. Strategic planning includes communication where under standing is forged, and employees' participation developed. | The strategic plan is integrated from top-down and bottom-up and cascading to practices. | 2. In strategic planning, there are briefings, discussions, and involvement of stakeholders or networking. | Relevant stakeholders are invited to the planning process. | 2. In strategic planning there is public sharing and involvement of the people. | Networking and training volunteers in the area to support area activities. |

**Table 3:** Assessment of Application of the Sufficiency Economy by the Land Development Department (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices |
| 2nd dimension<br><br>Systematic and transparent management | 1. Systematic management enhancing efficiency at work. | There are many dimensions in management and driving forces to achieve goals. | Continuing development of management. | There are regular meetings to monitor and direct performance. | 1. Management innovation to create benefit to network and people. | Innovate and implement new technology to improve performance and population services, e.g., LDD Soil Guide, Zoning application, and AGRI Map. |
| | 2. Transparent management with policy, measures, monitoring system, and information disclosure. | The department implements standard monitoring and evaluating practices. There is information dissemination in project procurement. | Management by focusing on customer and stakeholder. | Thinking of end results for people's benefit and continuing to improve performance to increase people's satisfaction. | 2. Create network involvement and aim for people and stakeholders' self-reliance. | There are agriculturalist development projects to support self-reliance, e.g., the 70,000 wells project, smart farmers, and knowledge exchange. |

**Table 3:** Assessment of Application of the Sufficiency Economy by the Land Development Department (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices |
| 3rd dimension<br>Competent and virtuous staff | 1. Enhancement of skills and knowledge related to tasks for which they are responsible. | There are various methods for developing staff's knowledge and skills, including the King's philosophy. | 1. Staff Development in analytical thinking, critical thinking, and creative thinking. | There are activities and rewards to promote staff morale and encourage better performance. | 1. Staff are capable of creativity and innovation development. | |
| | 2. Institutionalization of morals and ethics for staff. | Morals are cultivated in core values, and there are various activities to promote staff morals. | 2. Staff could have moral and ethical livings, both in work life and personal life. | | 2. Staff are moral and ethical and are role models for others in society. | |

**Table 3:** Assessment of Application of the Sufficiency Economy by the Land Development Department (Cont.)

| Dimension | Compliance Level | | Comprehension Level | | Inspiration Level | |
|---|---|---|---|---|---|---|
| | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices | Assessment Factors | Department's Practices |
| 4th dimension<br>Benefits to organization and society | 1. Work performance of agencies to achieve the organization's mission and objectives. | Annual performance rating is above goals. | 1. Work performance of agencies to achieve the national strategy. | There is development in information, research, and activities to properly manage soil resources, so agriculturalists can increase income and achieve better quality of life. | 1. Work performance of agencies has an impact on society or humanity. | |
| | 2. Organization's ability to face or respond to changes. | There is risk awareness in uncertain situations by implementing PMQA practices. | 2. Ability to create happiness and a quality workplace for all employees. | There is an employee happiness survey, and the results show in high level. | 2. Intended to give benefits to society and humanity. | |

**Table 4:** Roadmaps of Application of Sufficiency Economy by Land Development Department

| Strategic Goals | Goal Deadline | Status* 2022 | SE level | Measures |
|---|---|---|---|---|
| **Moral and ethical staff** | | | Comprehension | Support staff to live their lives based on morals and ethics, both in their work and personal lives. |
| Instill awareness of morals and ethics. | 2023 | | 3rd dimension, 2nd assessment factor | Top management exhibits good leadership to encourage and motivate desired staff behavior. |
| Rewarding role models of moral and ethical individuals. | 2023 | | 3rd dimension, 2nd assessment factor | Promoting evidence of a role model of moral and ethical individuals. |
| **Creativity and Innovation Development** | | | Inspiration | The staff is capable of creativity and innovation development. |
| Increase efficiency in the development process through consistent application of technology. | 2024 | | 3rd dimension, 1st assessment factor | Project to explore and develop digital technology to increase work efficiency. |
| Enhance decision-making effectiveness by developing an enhanced integrated database, applying an advanced data analytics approach, and introducing innovative sources. | 2024 | | 3rd dimension, 1st assessment factor | - Project which enhances the integrated database by applying advanced data analytics approaches aimed at extracting value from existing data.<br>- Exploration of next-gen innovative resources which support developing and implementing next-gen innovative tools that are related to the mission. |

**Table 4:** Roadmaps of Application of Sufficiency Economy by Land Development Department (Cont.)

| Strategic Goals | Goal Deadline | Status* 2022 | SE level | Measures |
|---|---|---|---|---|
| **Virtuous and ethical way of life** | | | Inspiration | Staff have virtue and ethical way of life and can act as role models for others. |
| Development of ecosystem for virtuous and ethical workplace. | 2024 | | 3rd dimension, 2nd assessment factor | A project of intended giving benefit supported by top management. |
| Staff behave with a fully developed sufficiency mindset and embedded virtues and knowledge. | 2024 | | 3rd dimension, 2nd assessment factor | Regular sufficiency economy dialog in accordance with the current Intended Giving Benefit (IGB) or Corporate Social Responsibility (CSR) Guidelines. |
| Staff move from being self-focused to being other-oriented. | 2024 | | 3rd dimension, 2nd assessment factor | Activities of intended giving benefit. |
| **Impact of performance on society and humanity** | | | Inspiration | Work performance of the department has an impact on society and humanity. |
| Eco-friendly drive: Develop a product or initiate a process to increase environmentally friendly outcomes and effectiveness. | 2025 | | 4th dimension, 1st assessment factor | Optimization and new development of products/ processes for environmentally friendly rainmaking. |

**Table 4:** Roadmaps of Application of Sufficiency Economy by Land Development Department (Cont.)

| Strategic Goals | Goal Deadline | Status* 2022 | SE level | Measures |
|---|---|---|---|---|
| Anchoring sustainability aspects in the strategic goals of the department and their integration in strategic management decisions. | 2025 | | 4th dimension, 1st assessment factor | Expansion of participation in sustainable development goals. |
| **Sustainable Happiness Society** | | | Inspiration | Intended to give benefits to people and society. |
| Realize transparent society citizenship and integrate it within specific divisions. | 2025 | | 4th dimension, 2nd assessment factor | - Standardization and comprehensive establishment of global relationship management.<br>- Continuous support of society's citizenship behavior. |
| Deepening of a global partnership concept to provide sustainable solutions. | 2025 | | 4th dimension, 2nd assessment factor | Introduction of a partnership concept that is globally applicable for international networking. |

*Note*: Status could be in progress, partially achieved, or achieved

## 5. Discussion

The results reveal the sufficiency economy assessment of the Department of Royal Rainmaking and Agricultural Aviation and the Land Development Department, and the roadmaps of application of the sufficiency economy to the inspiration (highest) level. Although this study includes only two public departments, which are under

the Mission of Services in Resource Management for Production under the Ministry of Agriculture and Cooperatives as case studies, it can be generalized to other public agencies. If other agencies were to apply the roadmap to improve their applications of the Sufficiency Economy Philosophy, a modification would be needed to reflect the reality of their mission, responsibilities, and current application situation. The rationale for proposing projects or activities in roadmaps of application of the sufficiency economy for these two departments, which can be applied to other government agencies, are based on related studies as follows.

**5.1 Quality of Work-life and Happiness**

Quality of Work-life is defined as "employee satisfaction with a variety of needs through resources, activities, and outcomes stemming from participation in the workplace" (Sirgy et al., 2001, p. 242). According to several studies, employees who have high quality of work-life tend to report higher levels of engagement with their organizations, job satisfaction, job performance, and lower levels of turnover and personal alienation (Efraty & Sirgy, 1990; Efraty, Sirgy & Claiborne, 1991; Lewellyn & Wibker, 1990).

Happiness is defined by Veenhoven (1984: 22-24) as "the degree to which an individual judges the overall quality of his/her own life-as-a-whole favorably." Following this definition, the term 'happiness' has been used in a variety of contexts, including interchangeability with terms such as "wellbeing" or "quality of life" and it refers to both individual and social welfare. Given the importance of work, a positive relationship between work-life satisfaction and personal-life satisfaction of employees is revealed by several studies in the related area (e.g., Chan & Wyatt, 2007; Sirgy et al., 2008, Al-Qutop and Harrim, 2011). Senasu and Singhapakdi (2014) find that job satisfaction has a positive effect on happiness in Thais. This finding is consistent with studies on happiness in other countries (e.g., Spector et al, 2007; Jaafar et al., 2012; Veenhoven, 2012). In other words, when people are satisfied with their jobs, it can have a positive impact on other aspects of their personal life, which can lead to happiness. The assessment of the Department of Royal Rainmaking and Agricultural Aviation reveals that although the staff is competent and devoted to hard work, many employees feel quite frustrated and exhausted. Therefore, top management should establish strategic goals of improving the quality of work-life by managing working hours, adjusting working procedures, and implementing happy workplace projects.

### 5.2 Institutionalization of Ethics, Virtue, and Ethical Way of Life

The institutionalization of ethics is defined by Singhapakdi and Vitell (2007) as "the degree to which an organization explicitly and implicitly incorporates ethics into its decision-making processes" (p. 284). Based on Brenner's (1992) explicit/implicit categorization, Singhapakdi and Vitell provide examples of the implicit form of ethics institutionalization include ethical leadership and open communication. Codes of ethics and ethics training are two examples of the explicit form. Furthermore, Singhapakdi et al. (2010) have revealed that explicit ethics cultivation precedes implicit ethics cultivation. Marta et al. (2013) find that the effect of ethics on the quality of work-life is higher in collectivistic cultures such as Thailand than in individualistic cultures such as the U.S. In addition, the findings suggest that organizations in Thailand should focus on improving implicit ethics cultivation to raise perceptions of the ethics of their organizations, which is an important long-term variable in business success.

For the Department of Rainmaking and Agricultural Aviation, the assessment in the application of the Sufficiency Economy shows that their staff is moral and ethical, both in work life and personal life so there is only one further step which is to put effort into making staff become role models to others in society. The suggestions in the roadmap are the development of an ecosystem for virtue and ethics in the workplace, for staff to behave with a fully-developed sufficiency mindset and embedded virtue and knowledge, and to explicitly move from being self-focused to being other-oriented. These goals can be achieved by implementing some projects and activities, e.g., projects/activities intended to give benefit to others and to developing a virtue ecosystem by setting regular sufficiency economy dialog in accordance with Intended Giving Benefit (IGB) or Corporate Social Responsibility (CSR) Guidelines.

For the Land Development Department, the institutionalization of morals and ethics still needs to be improved before it can move up to act as a role model in society. The implicit form of ethics institutionalization via ethical leadership behavior plays a significant role in encouraging and motivating desired staff behavior. Additionally, a role model of a moral and ethical individual also reinforces the desired behavior. Enhancing implicit ethics institutionalization may involve significant change because it involves unspoken and unwritten changes, like making leadership and decision-making more transparent.

And it may also involve a call for upper management to discuss ethical issues more actively than they have in the past. The leaders of the Thai government should advise every public agency to establish ethics guidelines. This makes it clear that the government has played a part in raising awareness of ethics, at least in its explicit forms, which may be instrumental in raising implicit institutionalization.

**5.3 Sustainable Happiness Society**

Thailand is recognized as a prominent Buddhist country with nearly 95% of her population being Buddhist, and her culture extremely influenced by Buddhism. Buddhist teachings can nurture moral principles in Thai people, which is likely to improve their happiness (Wongtada et al., 2006). Religiousness can be a direct determinant of happiness, additionally, Senasu and Singhapakdi (2017) reveal that religiosity can also be a moderator of determinants of happiness, particularly in a Buddhist society like Thailand. They suggest that the government's role is to promote a higher degree of adherence to religious teaching and a more contented and moral population. The contented population can create more social capital, work harder, are healthier, and are more self-sufficient (Lyubomirsky et al., 2005; Cummins et al., 2009). Additionally, a concept of sustainable happiness proposes a new approach to happiness by combining reflection on sustainability issues with opportunities to improve one's quality of life and contribute to the well-being of individuals, communities, organizations, and the world (Dettori & Floris, 2019).

The shortcomings identified in assessment results for the 4$^{th}$ dimension of the inspiration level for both the Department of Rainmaking and Agricultural Aviation and the Land Development Department can be addressed by implementing some projects and activities. Expansion of participation in sustainable development goals and continuous support of society citizenship behavior are examples of important continuous efforts the department leaders need to pursue.

**5.4 Creativity and Innovation Development**

Creativity and innovation have a strong connection as creativity is considered a starting point of innovation (Amabile, 1996). In the case of an organization, successful innovation comes from an individual or team's creativity. Innovation has been spotlighted by organizations from diverse industries including public agencies. An innovation introduces

something new or an improvement which creates new value to the organization (Jenjarrussakul, 2017). In the global context, creativity and innovation are highlighted as essential skills (Nakano & Wechsler, 2018). Amabile (1996) explains that the creativity of an individual comprises three components: expertise, creative thinking, and intrinsic task motivation. Within the context of an organization, Amabile shows a strong relationship between work, expertise and intrinsic task motivation and explains that creative thinking is "something extra" that helps elevate expertise and motivation.

Since 2016, Thailand has moved towards a value-based economy with a focus on innovation (Thairath, 2016). As one of the core pillars of this movement, government agencies adopted digital technology as part of the improvement of their public services (Office of Research and Human Resource Development, Office of the Civil Service Commission, 2017). Digital innovations are introduced and adopted in government to create public values which meet citizens' expectations (Panagiotopoulosa et al., 2019). Several digital technologies such as applications, government portals, as well as data approaches such as data science, artificial intelligence, and policy analytics have been adopted. The adoption of such technologies allows government agencies to extract new values from their existing data. Thus, digital innovations are able to support organizations in making suitable decisions as well as improve their internal operational efficiency.

According to our findings, the assessment of the Land Development Department reveals that their staff is capable of creativity and innovation development, especially with the implementation of technologies aimed at improving their performance and services. Additional projects in the 3rd dimension of the inspiration level would encourage the department to create further values. Integration of existing systems and data, as well as the development and implementation of next-gen innovative tools are examples that could help the department increase its efficiency and effective decision-making.

## 6. **Conclusion**

To the best of our knowledge, this study is a pioneer study in roadmaps for developing higher-level application of the Sufficiency Economy Philosophy (SEP) for Thai public agencies. Despite the fact that the Office of the National Economic and Social Development Board has designated the Sufficiency Economy Concept and Philosophy as the major guideline to be adopted since 2002, Jenjarrussakul and Senasu (2022) found that there was still

a significant lack of understanding among government officials at all levels of the SEP or how to apply it, both in work and in their personal lives. Therefore, the application of the Sufficiency Economy Philosophy in the formulation of policy, action plans, management, and public administration still need to be unified in order to effectively drive Thailand towards the successful accomplishment of the Philosophy. It is recommended that policymakers should make a greater effort to provide precise instruction, offer official support to instill the right mindset, and improve practices based on the Sufficiency Economy Philosophy for all people and officers. This research suggests roadmaps for the needed strategic goals and measures to enhance the application of the SEP in public agencies by elaborating on two department cases. This is part of the government's role but efforts still need to be made by organizations, monasteries, communities, households, and individuals to contribute to ensuring sustainable happiness for all.

A limitation to this study that should be mentioned is that it includes only two public departments as case studies. If other agencies were to apply the roadmap to improve their applications of the Sufficiency Economy Philosophy, modification would be needed to reflect the reality of their mission, responsibilities, and current application situation. It would be beneficial if future research could collect data from other government agencies, private organizations, or non-government organizations in order to confirm the findings of this study.

## Acknowledgment

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# Resilient Future Strategy of Full-Service Airlines in Thailand

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## Abstract

Aviation business is an air transport business which constitutes an important transportation infrastructure for tourism and commerce businesses. Moreover, aviation business is the first component of the aviation industry in the passenger and cargo transportation services. This research study is based on the desire to analyze future studies of future aviation after the Covid-19 situation subsided and returned to normal as well as the future aviation setting in the next ten years. In the future, aviation business especially full-service airlines may face various business drivers and uncertainties such as economy, political stability, aging society, renewable energy, and cutting-edge technology. Furthermore, the passenger demand and the supply chain constitute another main reason for the aviation industry to adapt to these changing situations.

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Therefore, the study of the contexts, trends, drivers, and uncertainties impacting full-service airlines in Thailand is used to analyze the scenarios and the future business opportunities for the formulation of resilient future strategy of the full-service airlines in Thailand consistent with the diverse needs of passengers. The strategy of Value Proposition to consumers, Open Business Model, and Business Model Canvas are important to change and develop an organization's potential in response to the business context to ensure stable and sustainable business operation.

**Keywords**: Aviation Business, Full-service Airlines, Resilient Future Strategy

# กลยุทธ์การปรับตัวแห่งอนาคตสำหรับธุรกิจสายการบินเต็มรูปแบบของประเทศไทย

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## บทคัดย่อ

ธุรกิจการบิน เป็นธุรกิจบริการขนส่งทางอากาศ (Air Transport) ซึ่งเป็นโครงสร้างพื้นฐานทางการคมนาคมที่สำคัญต่อธุรกิจการท่องเที่ยวและการพาณิชย์ ธุรกิจการบินเป็นองค์ประกอบแรกของอุตสาหกรรมการบินในการขนส่งผู้โดยสาร (Passenger Service) และสินค้า (Cargo Service) ซึ่งการศึกษาวิจัยในครั้งนี้สืบเนื่องจากความต้องการในการวิเคราะห์อนาคตศึกษาของธุรกิจการบินภายหลังสถานการณ์ COVID-19 คลี่คลายกลับเข้าสู่ภาวะปกติ และบริบทของธุรกิจการบินในอนาคตอีก 10 ปีข้างหน้า ซึ่งอาจทำให้ธุรกิจการบินโดยเฉพาะสายการบินที่ให้บริการแบบเต็มรูปแบบ (Full-Service Airlines) ต้องเผชิญกับปัจจัยขับเคลื่อนทางธุรกิจที่หลากหลาย และความไม่แน่นอน เช่น เศรษฐกิจ เสถียรภาพทางการเมือง การเข้าสู่สังคมผู้สูงอายุ พลังงานทดแทน และเทคโนโลยีที่ล้ำสมัย อีกทั้งความต้องการของผู้โดยสาร และห่วงโซ่อุปทานที่เป็นอีกสาเหตุให้ธุรกิจการบินต้องปรับตัวให้ทันกับสถานการณ์ที่เปลี่ยนแปลง

ดังนั้น การศึกษาบริบท แนวโน้ม ตัวขับเคลื่อน และความไม่แน่นอนที่ส่งผลต่อธุรกิจสายการบินเต็มรูปแบบในประเทศไทยในการวิเคราะห์ฉากทัศน์และโอกาสทางอนาคตของธุรกิจนั้น เพื่อใช้ในการวางแผนกลยุทธ์สำหรับการปรับตัวของธุรกิจสายการบินเต็มรูปแบบในประเทศไทย (Resilient Future Strategy) ให้ตอบสนองกับความต้องการที่หลากหลายของผู้โดยสาร

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ด้วยการวางกลยุทธ์การส่งมอบคุณค่าแก่ผู้บริโภค (Value Proposition) การทำโมเดลธุรกิจแบบเปิด (Open Business Model) และการเขียนแผนธุรกิจ (Business Model Canvas) ในการปรับเปลี่ยนและพัฒนาศักยภาพองค์กรให้ตอบสนองกับบริบททางธุรกิจที่จะต้องเผชิญจึงเป็นสิ่งสำคัญ เพื่อให้สามารถดำเนินธุรกิจได้อย่างมั่นคงและยั่งยืน

**คำสำคัญ**: ธุรกิจการบิน สายการบินเต็มรูปแบบ กลยุทธ์การปรับตัวแห่งอนาคต

## Introduction

According to the report of International Civil Aviation Organization (International Civil Aviation Organization, 2019), the passenger transport volume worldwide between 1995-2015 grew 5.4% a year. The passenger transit volume was predicted to expand at a rate of 4.3 percent per year over the next two decades, from 2015 to 2035 and the passenger transport volume in 30 years between 2015-2045 would grow 4.1% a year (International Civil Aviation Organization, 2019). Additionally, the forecast of International Civil Aviation Organization indicated that the routes expected in the future to have the highest passenger transport volume will be domestic routes in Central and South Asia, followed by domestic routes of North America, and international routes in Europe (Intra Europe) respectively. In Southeast Asia, domestic travel will expand at an average rate of 5.3 percent over the next 20 years and 5.2 percent over the next 30 years (Civil Aviation Authority of Thailand, 2019).

Therefore, as indicated in passenger transit volume of increase passenger's demand in future, it is significant to study about the business trends, drivers and uncertainties in 10 years to analyze the scenarios and the future business opportunities for the formulation of resilient future strategy of the full-service airlines in Thailand consistent with the diverse needs of passengers.

In 2019, tourism was Thailand's principal economic engine, accounting for 11% of GDP and benefited from nearly 40 million foreign visitors, which supported produced income of almost 2 trillion and employed more than 7 million people, with 20% of total employment (Surawattananon et al., 2021). COVID-19 has had a significant impact on the global tourist environment, not just disrupting worldwide travel (Nhamo et al., 2020) and leaving Thailand's tourism business with a greater scar than prior incidents. Consequently, it is critical that all stakeholders, including policymakers, understand how tourist demand is changing and where Thailand stands in the global competition to attract visitors. Global visiting patterns will shift after the epidemic.

Based on the future forecast and the analysis of the trends, drivers, and uncertainties of the aviation industry, which is the industry of the future, it is found that there are 5 major factors impacting the future of aviation industry (International Air Transport Association, 2018):

1. Social factor: Thailand will become a completely aging society by 2024. As a result, senior travelers and visitors will contribute to an attractive and promising market (Roongruengratanakul, 2019; Ryan & Trauer, 2012; Suwansingha et al., 2020).

2. Technological factor: Using AI in airline design and supply chain management system to save costs, using Internet of Things (IOT) meaning all things connected and sharing information through internet, or using technology to develop environmentally friendly clean energy will impact airline business in the future (Capoccitti et al., 2010; Riwo-Abudho et al., 2013).

3. Environmental factor: Natural catastrophes and severe weather are uncontrollable external variables that impact the aviation industry (Capoccitti et al., 2010; Hasan et al., 2021; Ryley et al., 2020).

4. Economic factor: Changes in fuel prices, for example, cause airlines to face large expenses(Holloway, 2016; Zhang & Zhang, 2018).

5. Value: To meet future passenger demand, airlines must give value to consumers (Lawton et al., 2011; Pereira & Caetano, 2017; Urban et al., 2018).

The trends, drivers, and uncertainties of the 5 aspects will constitute major factors impacting the future of aviation industry in 10 years. Therefore, the full-service airlines in Thailand need to learn and adapt itself for future survival. According to these fundamental challenges, as passenger demands rise, the airline industry must focus on developing new services and technology to assure improved passenger safety and satisfaction.

## Scope of Study

1. The research was conducted through a review of situations from documents, research articles, and online information from relevant government agencies on the issues of contexts, trends, drivers, and uncertainties impacting the full-service airline in Thailand, the scenarios, and the future business opportunities, as well as the resilient future strategy of the full-service airline in Thailand.

2. This study was based on the data analysis using the strategic tool of scenario scanning, consisting of simulation of situations with the trend to take place in the future,

the analysis of opportunities, challenges, and risks that will be enhanced to formulate the strategy to ensure the organization's acknowledgement and resilience to changing situations in a timely manner.

## Objectives

1. Study the contexts, trends, drivers, and uncertainties impacting the full-service airlines in Thailand.

2. Analyze the scenarios and the future business opportunities of the full-service airlines in Thailand.

3. Recommend the resilient future strategy of the full-service airlines in Thailand.

## Definition

1. The airline business in Thailand is divided into 2 types of namely full-service airline and low-cost airline.

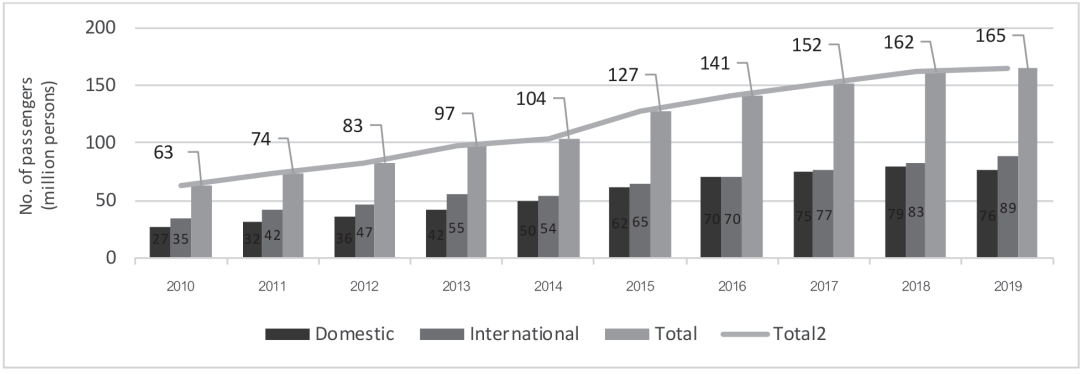
2. The full-service airline in Thailand means aviation business with continuous development of service quality and with relatively high costs, in terms of types of aircrafts and types of service accommodating equipment on board, etc. In Thailand, there are 2 main airlines namely Thai Airways International Public Company Limited (THAI), and Bangkok Airways Public Company Limited (Bangkok Airways).

## Overview of the Airline Business in Thailand

According to the report of the Civil Aviation Authority of Thailand (Civil Aviation Authority of Thailand, 2019), the statistics of the total number of passengers nationwide in the past 10 years between 2010-2019 revealed that Thailand still experienced continuous growth of the number of passengers every year from 2010. The average growth between 2010-2019 of the total passengers was 11.38% a year, divided into international passengers with the average annual growth rate of 10.77% and domestic passengers with the average annual growth rate of 12.13%. In particular, in 2019, there were 165 million passengers, divided into 88.82 million international passengers or up 7.16% from 2018 and 76.25 million domestic passengers or down 3.02% from the previous year. The number of domestic passengers decreased for the first time in 10 years. In terms of the shares of the number

of domestic and international passengers, it was found that in 2019, the share of the domestic passengers was 46.19% and the share of the international passengers was 53.81% (Civil Aviation Authority of Thailand, 2019) as in Table 1.

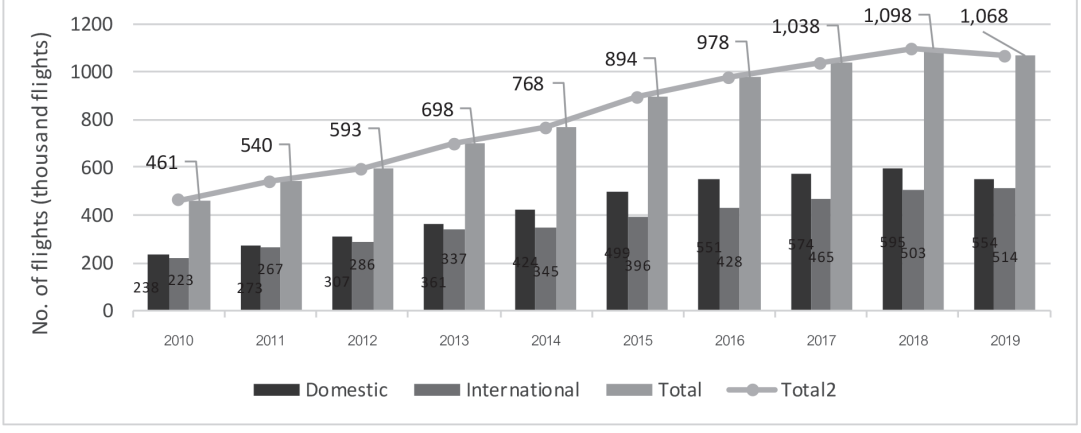
**Table 1:** Overview of the Statistics of the Number of Passengers Nationwide between 2010-2019




*Source*: Civil Aviation Authority of Thailand. (2019). *State of Thai aviation industry* 2019

The statistics of the growth of the total number of flights in Thailand for the past 10 years (2010-2019) revealed that the average growth rate of the total flights increased 9.83% a year, divided into the growth of international flights 9.72% a year and domestic flights 9.78% a year. The growth of flights was in accordance with the growth of the number of passengers (Civil Aviation Authority of Thailand, 2019).

**Table 2:** Statistics of the Total Growth of the Number of Flights between 2010-2019




*Source*: Civil Aviation Authority of Thailand. (2019). *State of Thai aviation industry* 2019

In 2019, there were 1.06 million flights, a decrease of 2.72 percent from the previous year, owing to the reduction in domestic flights to only 553,876 flights, a decrease of 6.89 percent from the previous year. This resulted from the fact that low-cost airlines altered the characteristics of their services by progressively rerouting local planes to foreign routes. Consequently, international flights grew to 513,952, a 2.18 percent rise over the previous year. (Civil Aviation Authority of Thailand, 2019).

## Airline Business in Thailand

According to the Civil Aviation Authority of Thailand, low-cost airlines had a market share of 72.77 percent of passengers traveling domestically. Simultaneously, full-service airlines had only 27.33 percent of the market, more than three times that of low-cost carriers. The share of this segment represented the popularity of domestic travelers who used airfare as a primary factor of travel (Civil Aviation Authority of Thailand, 2019).

Based on the report of Civil Aviation Authority of Thailand, in 2019 the shares of Thai airlines in the transport of passengers in regular international routes were as follows: THAI transported the highest number of passengers with 16.34 million passengers or 42.67%, followed by Thai AirAsia Co., Ltd. with the transport of 8.52 million passengers or 22.24%, and Thai Lion Air with the transport of 4.38 million passengers or 11.45% whereas Thai VietJet Air transported the lowest number of passengers in international routes with 528,052 passengers or 1.38% of the total number of the transport of international passengers (Civil Aviation Authority of Thailand, 2019).

Airline business in Thailand is divided into 2 segments:

1. Full-service airlines focus on providing accommodation and good impression of passengers through the services of food and beverages, luggage loading without additional charges, division of services into business and economy classes, etc. (Lohmann & Koo, 2013). Full-service airlines have long been established, with the continual growth of service quality and relatively high expenses in terms of aircraft types, service accommodating equipment on board, and so on. In Thailand, there are 2 main airlines namely Thai Airways International Public Company Limited (THAI) and Bangkok Airways Public Company Limited (Bangkok Airways).

2. Low-cost airlines focus on cost reduction or suspension in certain operations; special services requiring service charges; increased competitive pricing such as increased number of seats in the aircraft cabin; excess baggage weight charges; food and beverage sales, and so on (Lohmann & Koo, 2013). Low-cost airlines experience rapid growth and great popularity. In Thailand, there are 4 main airlines, namely Nok Airlines Public Company Limited (Nok Air), Thai Lion Mentari Company Limited (Thai Lion Air), Thai AirAsia Company Limited (Thai AirAsia), and Thai Vietjet Air Joint Stock Company Limited (Thai Vietjet Air).

## Related Concepts and Theories

In presenting the resilient future strategy of Thailand's full-service airlines for increasing competitiveness, airlines can employ a value proposition strategy to consumers by gaining access to their true value and by understanding their needs through the strategic tool used to research and evaluate the value proposition in order to identify market opportunities and to improve and develop the airline's business operations (Kan et al., 2019).

The open business model is a strategy that can be used to benefit the organization by collaborating with partners to strengthen the business and enable participation from other businesses, such as applying knowledge and technology to support services through systematic collaboration of external partners with companies with expertise in technology and aircrafts in the direction of outside-in (Chesbrough, 2007).

Moreover, the business model canvas is used to compile main information to be used for analysis of business planning, and future risk assessment. It will enable business to grow more efficiently and more systematically and formulate the business plan towards the same goals and direction (Osterwalder & Pigneur, 2010).

## Trends, Drivers, and Uncertainties

According to the report of International Air Transport Association (International Air Transport Association, 2018), aviation industry is in the targeted future industry. Aviation and transport industries experience growth worldwide. The future forecast and the analysis of trends, drivers, and uncertainties of the aviation industry reveal that There are major factors influencing the aviation industry's development in the next ten years as in Table 3 as follows:

**Table 3:** Analysis of Trends, Drivers, and Uncertainties of Aviation Industry in 10 Years

| Social | Technological | Environmental | Economic | Political | Value |
|---|---|---|---|---|---|
| Increased number of the elderly | Policy of increased significance of online safety | More turbulent weather | Privatization | Political instability such as protests, airport shutdown, airport arson | Delivery of values to customers |
| Next Normal | Human replacing technology | Utilization of sustainable energy in airlines | Global economic volatility such as inflation rate and currency crisis | Trade barrier hindering investment from international airlines | Customization |
| More facilitations for those with disabilities and with health problems | Dried up petrol worldwide | More awareness of food and water security | Redundancy of types of business in airline supply chain | Government's space policy | Accessibility to goods and services |

*Source*: Improved from International Air Transport Association, 2018

Based on the future forecast and the analysis of the trends, drivers, and uncertainties of the aviation industry, which is the industry of the future, it is found that there are 5 major factors impacting the future of aviation industry: 1. Social factor: By 2024, Thailand will become a complete aging society. Therefore, the elderly passengers and tourists will contribute to an interesting market with high potential 2. Technological factor: There will be restructuring to apply more technology, including information compilation and management on the cloud, the use of AI in the design and supply chain management system of airlines

to reduce costs, the use of Internet of Things (IOT) meaning all things with connection and sharing of information via internet, or the use of technology for the development of environmental-friendly clean energy, impacting airline business in the future 3. Environmental factor: certainly, natural disasters and turbulent weathers are external factors which are difficult to control and greatly cause damage to airline business 4. Economic factor: It is the factor that directly impacts airline business such as fluctuating petrol prices causing airlines to bear high costs 5. Value: the value delivered to customers by airlines become a key to airline business in response to the demand of passengers in the future.

The trends, drivers, and uncertainties of the 5 aspects will constitute major factors impacting the future of aviation industry in 10 years. Therefore, the full-service airlines in Thailand needs to learn and adapt itself for future survival.

## Wildcards

Wildcards constitute unexpected events in the future aviation business in 10 years which are highly improbable to happen (Hiltunen, 2006). But if they do happen, they will greatly impact the aviation industry such as the present outbreak of the COVID-19 pandemic. If such crisis does occur, it will stimulate continuous changes down to the grassroot level in terms of economic, social, environmental, and political changes, as well as new opportunities and challenges that organizations and stakeholders do not expect or prepare themselves. Organizations must evaluate and use a strategic tool for formulation or risk analysis in order to prepare for any eventuality in a timely manner. Unexpected events in the aviation industry such as climate change, natural disasters, earthquakes, tsunamis, floods, volcanic disruptions, major epidemics, emerging diseases, disruptive technology will create opportunity and impact to the aviation business such as electric vehicles and unmanned vehicle technology which will disrupt the development of the transport system for the future and impact the aviation industry in the future. Consequently, popularity of travelling by airplanes diminishes or ends. Moreover, the future development of aircraft renders travelling by airplanes more convenient, safer, and faster. The possible outbreak of World War III may directly impact the full-service airlines in Thailand in 10 years. Therefore, airlines need to consider and prepare themselves for future uncertainties.

## Key Trends and Uncertainties

The analysis using the strategic tool of scenario scanning is used to simulate the situation which tends to occur in the future and to accompany decision-making of the guideline at present to be able to accommodate the best opportunity in the future. Scenario scanning assesses the situation derived from the risk factors of business uncertainties. It enables the organization to acknowledge and adapt itself for change with the strategy to accommodate its goals with possible changes according to situations in a timely manner (Peterson et al., 2003). The analysis reveals that the factors of technology and creation or delivery of value proposition to passengers are factors that influence aviation business in the future. At the same time, passenger demand and the supply chain are the two most important factors causing uncertainty in the airline industry. The analysis of scenario scanning is divided into 4 scenarios namely scenario A (Passenger Demand vs Technology), scenario B (Passenger Demand vs Values), scenario C (Supply Chain vs Technology), and scenario D (Supply Chain vs Values) as in Table 4 as well as the scenario that presents the opportunities, challenges, risks, strategies, and competencies of the full-service airlines in the future as in Table 5.

**Table 4:** Analysis of the Scenarios of Uncertainties of the Full-service Airlines

| Uncertainty | Technology | Values |
|---|---|---|
| Passenger Demand | Scenario<br>**A**<br>Passenger Demand vs Technology | Scenario<br>**B**<br>Passenger Demand vs Values |
| Supply Chain | Scenario<br>**C**<br>Supply Chain vs Technology | Scenario<br>**D**<br>Supply Chain vs Values |

*Source*: Report of the Research Team, 2021

## Scenario A: Passenger Demand vs Technology

With the increased demand of travelling by airplanes in the future, advanced technology contributing to the development of services in response to the needs of passengers and providing the experience in new modes of travelling, full-time service airlines have the opportunity and trend of the development of seamless service such

as monitoring system of the status of passengers to prevent their disappearance, tracking system of luggage, etc. Moreover, the development of IoT (Internet of Things) ensures the development of advanced technology or platform combined with the "Big Data" of passengers which enables airlines to have information sources benefitting the invention of services to meet the demand of passengers, as well as the development of advanced aircraft technology in the future, cabin design with convenience and comfort, as well as application of multi-function cabin design to accommodate luggage. Moreover, in the age of disruptive technology, there are alternative vehicles that may replace travelling by airplanes such as Space X launch vehicles, unmanned aerial vehicles (drones), high speed trains, hyperloops, etc.

**Table 5:** Scenarios Presenting the Opportunities, Challenges, Risks, and Strategies of Full-service Airlines in the Future

| Scenarios | Opportunities | Challenges | Risks | Strategies |
|---|---|---|---|---|
| **A Passenger Demand + Technology** | Increase flying ability, reduce travelling time to meet the needs of customers, and increased opportunity for market share | Expand market share to elderly passengers, tourists requiring special assistance, injured athletes | Diverse modes of travelling (spread of market share) | Open Business |
| **B Passenger Demand + Values** | Create value through service, resulting in word-of-mouth marketing, and choice of return for service | In the future, there will be challenge in investment in new market with economy of the aging society | Imitation of mode of service – passengers may have changed needs or value of service | - Open Business Model<br>- Value Proposition |
| **C Supply Chain + Technology** | Development of IoT and more technology on Supply Chain with opportunity to meet the demands of passengers | Leader in the development of nuclear energy | - Imitation of technology<br>- Alternative vehicles that may replace aviation | - Open Business Model |

**Table 5:** Scenarios Presenting the Opportunities, Challenges, Risks, and Strategies of Full-service Airlines in the Future (Cont.)

| Scenarios | Opportunities | Challenges | Risks | Strategies |
|---|---|---|---|---|
| **D Supply Chain + Values** | Increase opportunity for management of competitive advantage for business | Build pricing bargaining power | Monopoly or increase in prices from partners | - Open Business Model<br>- Value Proposition |

*Source*: Report of the Research Team, 2021

### *Opportunities*

Advanced aircraft technology will enable passengers to benefit from enhanced flying capability and decreased trip time. As a result, airlines have the chance to compete and grow their market share.

### *Challenges*

Expansion of market share to elderly passengers and tourists requiring special assistance, and injured athletes is based on the analysis of the trend of Aging Society which will increase in the future. By 2030, the share of the aging population will reach 1,402 million people or 16.5% and by 2050 the number will reach 2,092 million people or 21.4% (Kiatnakin Phatra, 2020). Most consumers in this group are retired with high purchasing power and tend to look around for activities or hobbies such as tourism, meetings, and are willing to pay for products with quality or innovation that can upgrade the quality of their lives. The emphasis is therefore on services that enable access to the elderly passengers who require convenience, comfort, security, and safety, as well as health concerns, such as cabin design that accommodates the elderly's physical characteristics, anti-shock toilet floors, and toilet seat design that accommodates the elderly's knees and joints.

### *Risks*

The age of advanced technology results in the various modes of travelling, and alternatives of travelling by airplanes such as Space X launch vehicles, unmanned aerial

vehicles (drones), high speed trains, hyperloops, etc. They may reduce the market share of air travelling or it is less popular for passengers to travel.

### *Resilient Future Strategy*

Open Business Model (Outside-In): An airline can use the model to create value to its organization, increase ability in advanced technology through systematic cooperation of external partners with companies who have expertise in modern technology and aircrafts in order to support service innovation for airlines in the direction of Outside-In.

## Scenario B: Passenger Demand vs Values

The increased demand of travelling by airplanes in the future, in conjunction with creation of valuable experience to respond to the demand of passengers, and new modes of travelling are important. Subsequently, the full-service airlines tend to design services that create value connecting to rapid and convenient travelling process, provide good experience for passengers at each Touch Point of the Customer Journey, including safety to foster passengers' confidence through the airlines' various measures such as regular inspection and maintenance of airplanes for good competency, good standards to select and train employees for efficiency, application of Telemedicine for medical counselling in the case of emergency, etc. Moreover, there are additional services to facilitate and create service values such as special assistance during travelling for the elderly, the sick, or mothers travelling with small children, etc. which will be a business advantage as passengers will feel that the services that they receive are more worthwhile than the airfare that they pay.

### *Opportunities*

When an airline can create service values to enable passengers to acknowledge and answer the demand of passengers based on correctness, accuracy, and straightness in terms of speed in providing services, accommodations, safety, and good impression, as a result, the passengers continue to use the services, and contribute to word-of-mouth marketing, airline loyalty, choice of return for services, and the particular airline as first priority each time they travel.

### *Challenges*

In the future, there will be challenges in investment in new markets of Silver Economy and the airlines will acquire increased market share in the elderly passengers, tourists requiring special assistance, injured athletes. Principally, this group of consumers will be willing to pay in exchange for convenience, comfort, safety assurance, and health awareness.

### *Risks*

Imitation of the modes of services or creation of service advantages which are similar will make passengers feel that they can choose any airline as they will receive similar services, the modes of services being easy to imitate. At the same time, in the future passengers may have changing needs or changing service values which may accord with the changing norm, context, or technology in the future.

### *Resilient Future Strategy*

Open Business Model (Outside-In)

Open business model is used to create values for airlines, with ability to create value through systematic cooperation with companies who are external partners such as cooperation with companies providing ground services to follow up and receive luggage with speed, accuracy, and safety, as well as catering companies with satisfaction survey of food on board to concretely respond to the needs of customers and to ensure the passengers' sentiment that the services are worthwhile for the particular travel.

Analysis of Value Proposition to Passengers

Airlines need to understand the demand of passengers to provide the services that respond to satisfaction, service delivery that is safe, with quality, standards, and punctuality. Consequently, passengers are happy to return for continuous services through word-of-mouth, satisfaction survey, provision of complaint channels such as customer service, meetings with passengers through sales offices and visitors centers, etc. in order to understand the needs and wants of passengers and to design value service to truly meet their demand.

## Scenario C: Supply Chain vs Technology

Airline industry competition is going to get more intense in the future. There will also be a need for energy to replace oil and cutting-edge technology to make new vehicles like drones and space rockets that can meet the needs of customers and take over the traditional aviation industry. In addition, artificial intelligence (AI) and IOT (Internet of Things) systems that the aviation industry brings into service to meet the needs of passengers and create a new travel experience. There are systems that reduce the use of human labor and reduce labor costs with a proclivity to;

- A nuclear battery is a type of battery that can be used to store nuclear fuel. Major countries around the world have been working on prototype nuclear batteries and nuclear power plants that can power cars like the Space X rocket in the future without relying on gasoline.

- The leading aviation industry policy plan focuses on the development of innovative aircraft design technologies. Multi-function Cabin Design to support luggage and goods while having a small number of passengers and upgraded to be an exporter Multi-function Cabin Design Plan.

- Research and development of the service of the leading aviation industry in the form of a seamless service, starting from booking seats through various channels. Online check-in traveling on board with a system to track passenger status from the check-in process via X-ray channels or boarding gates. Baggage tracking systems with artificial intelligence (AI) systems can reduce the number of employees at each step and also reduce staff expenses, both in compensation and training.

### *Opportunities*

The development of IoT (Internet of Things) ensures the development of modern technology or platform combined with “Big Data” of the passenger ticketing system, identification of passengers’ coordinate to know of their whereabouts in case they do not check in on time so that airlines can sell the tickets of these passengers to other passengers to increase their revenue.

### *Challenges*

Leadership is developed of the prototypes of Nuclear Battery and Nuclear Energy Producing Plants that can accommodate the future vehicles such as passenger planes, and Space X launch vehicles without reliance on petrol. Airlines are upgraded into leading exporters of nuclear battery prototype and nuclear energy charging stand prototype.

### *Risks*

As the leading aviation industry places importance on research and development of the prototypes of Nuclear Battery and Nuclear Energy Producing Plants that can accommodate the vehicles of the future such as passenger planes or Space X launch vehicles without reliance on petrol or alternative vehicles such as unmanned aerial vehicles (drones), high speed trains, hyperloops, etc., the market share of the airline industry may be reduced, or it may be less popular for passengers to travel.

### *Resilient Future Strategy*

Open Business Model (Outside-In) is used in conjunction with other company partners to develop innovation and technology such as the prototypes of nuclear battery and nuclear energy producing plants that can accommodate the vehicles of the future such as passenger aircrafts, Space X launch vehicles without reliance on petrol to increase value to the supply chain of the aviation industry.

## Scenario D: Supply Chain vs Values

The aviation industry relates to the supply chain from the upstream industry such as engines, parts supply, aircrafts, catering on board to the downstream industry such as airline passenger services, etc. to create value to both airlines and passengers, to enable business to have outstanding ability over other competitors, and with the opportunity to increase profits and market share. In the future, the model to increase value to the supply chain will establish safety and quality standards from all industries relevant to the supply chain such as stricter internal audit, management system with quality, and with accountability from agencies such as Civil Aviation Authority of Thailand, International Civil Aviation Organization, Hazard Analysis Critical Control Point or HACCP (management system concerning food safety), etc.

### *Opportunities*

When an airline can create service values to enable passengers to acknowledge and answer to the demand of passengers' satisfaction, it provides the opportunity to create business competitive edge, increase flying routes, and increase the frequency of flight schedules.

### *Challenges*

The existence of various industries in the supply chain of aviation business creates bargaining power to acquire goods with quality and with acceptable prices to increase the opportunity to make profit and to make passengers impressed with quality goods and services.

### *Risks*

Airline business relies on external factors that may derive from the monopoly of goods. In case of crisis, there may be shortage of goods such as petrol, etc. The supply chain may raise the prices, leading to higher production costs, lower profits, and changing values of passengers. As a result, airlines must look for new values, investment in research and development, as well as overcome obstacles to find new supply chain to build bargaining power and to be able to deliver value in response to customers' demand.

### *Resilient Future Strategy*

Open Business Model (Outside-In)

An open business model is one in which an airline cooperates with partner companies in the supply chain to create value for the organization, increase competitiveness, and increase business opportunities, such as Airbus as an engine partner with a ground services company for rapid, accurate, and safe ground handling of luggage.

Analysis of the Value Proposition to Passengers

The most critical individuals for an airline are "passengers." As a result, it is critical to understand passengers' demands and the genuine value of travel. Apart from an aircraft's timely, safe, and convenient departure-arrival, service is another factor that passengers

consider while flying long distance with an airline, including a larger seat, food and beverage service during flight, and accommodations throughout flight. This is the kind of service an airline should appreciate.

## Strategy Implementation

The strategy implementation, as illustrated in Figure 1, reveals that the future airline business, in addition to service and safety, must consider the application of technology in conjunction with the ever-changing needs of passengers, as well as the creation and delivery of Value Proposition by the airline to passengers. The organization should emphasize the importance of business partners in terms of technology and service in order to increase passenger confidence and to support future business operations, as well as the relationships forged between business and passengers via various channels in order to address value-related questions with an experience in convenience and comfort that is distinct from service technology based on quality and safety. Technology is applied to ensure convenience and comfort to passengers in response to their true needs unmet needs). Moreover, in the future, the trend of the elderly and the health-conscious groups with high purchasing power will create business opportunity and increase profits for the airline business on a sustainable basis.

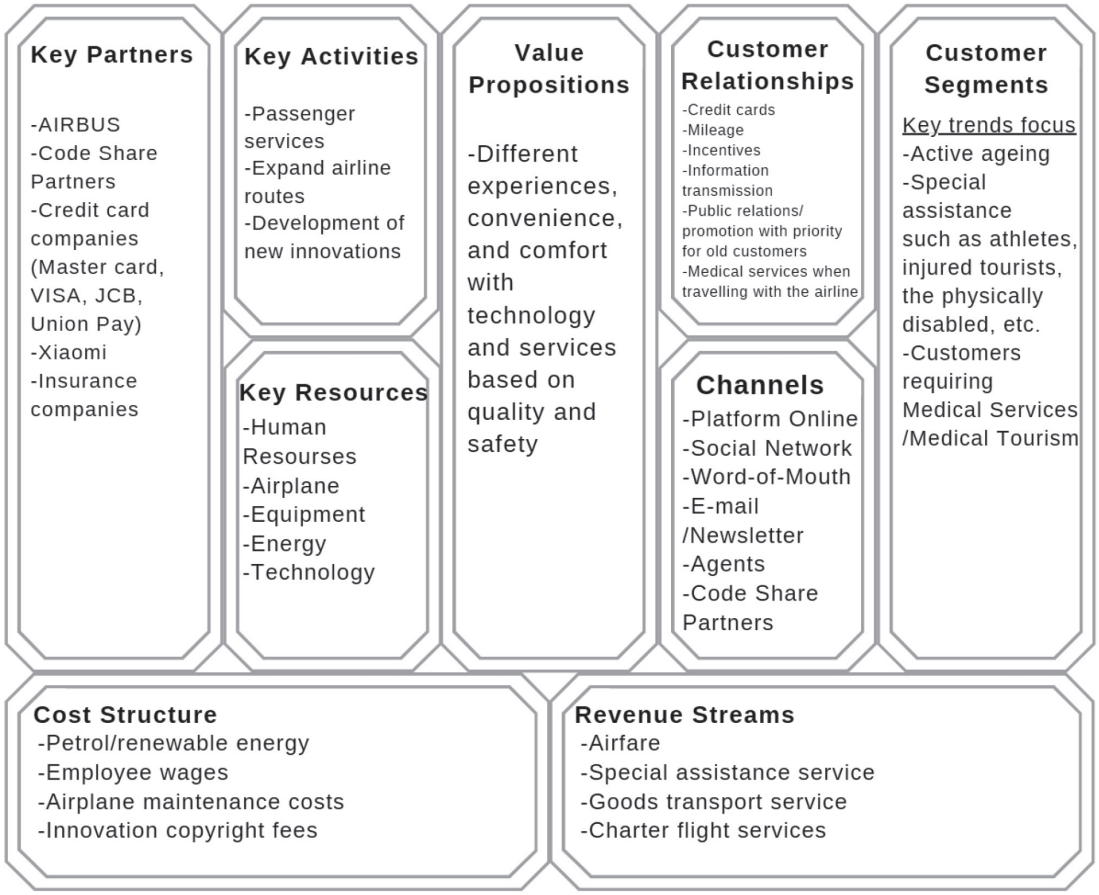



**Figure 1:** Full Business Model Canvas

*Source*: Report of the research team, 2021

## Conclusion

The future of aviation business especially the full-service airlines may have to face various business drivers and uncertainties such as national economy, Thailand's political stability, aging society, renewable energy, advanced technology. Passenger demand and supply chain are yet another reason that the aviation business should adapt itself to the changing situations and uncertainties of unexpected situations (wildcards) of the aviation business in 10 years.

As for the full-service airlines in Thailand in 10 years, the analysis of the scenarios of the factors of technology and the creation or delivery of value proposition to passengers are the factors influencing aviation business. At the same time, passenger demand and

supply chain are major factors of uncertainties, resulting in the necessity for airlines to adapt themselves. The research team has formulated the resilient future strategy as follows:

Strategy of value proposition to passengers is formulated to reduce the risks of nonprofitable products and services and not in response to the needs of passengers such as airline routes. The value proposition strategy is in line with the strategic concept of Kan et al., (2019). To increase competitiveness, airlines can employ this strategy to gain access to passengers' true value by analyzing the value proposition to passengers with the goal of expanding market opportunity, improving service experience, and enhancing the development of the airline's business operation.

Strategy of open business model is formulated to reduce production costs such as innovation and technology management costs which are in line with the strategic concept of Chesbrough (2007). To benefit an organization, it is recommended to cooperate with partners to strengthen the business which will allow other businesses to participate such as application of knowledge and technology to support service work through the systematic cooperation of external partners with companies who have expertise in technology and aircrafts in the direction of outside-in.

Strategy of business model canvas is designed to assist in reducing redundant management, manufacturing expenses, and operating time, as well as to demonstrate the total business. This is consistent with Osterwalder and Pigneur's strategic concept (2010). The analysis of business planning and risk management in the future will enable business to grow and the system of which can be efficiently organized, as well as formulation of the plan to determine the business direction in moving towards the same direction and goals. The three strategies serve as a strategic tool for determining passenger desires and needs, designing services that truly meet passenger demand, combining the full-service airline industry with potential, efficiently generating competitive advantage in response to changing business conditions, and generating profits, resulting in the ability to operate a sustainable business.

## Recommendations

Finally, researchers recommended the above strategies that can be implemented to benefit the full-service airlines in Thailand through the formulation of policy recommendations to ensure clarity and application as follows:

1. The full-service airlines in Thailand should examine scenarios with unclear business risks in order to enable the organization to recognize and respond to changing circumstances in a timely manner, allowing the company to expand and the system to operate efficiently.

2. The full-service airlines in Thailand should analyze the behavior of passenger demand and the competition of full-service airlines at international level to ensure that the organization can formulate the guideline to accommodate the best opportunities and challenges as well as future competitive advantage.

3. The full-service airlines in Thailand should collaborate with business partners and the supply chain to guarantee that the organization engages with technology specialists and updates, as well as builds on expertise and technology to support services and aircraft.

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# Challenges of Research University in Thailand in the Era of Education Disruption

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## Abstract

Higher education is undergoing a period of significant transformation. While older, more prestigious universities may be less impacted by these changes or experience their effects more slowly than other institutions, practically all universities are currently involved in attempts to adapt and change as the higher education market, finances, and technology advance. These adjustments, which may be challenging for big and complicated institutions with a strong sense of their history and reputation, might meet both internal and external pushback. Although the Thailand university system is in many respects stable, strong, and relatively well-functioning, this article is one result of the nation's recognition that universities may lack the strategic and institutional adaptability that the future will need. Due to the widespread COVID-19 pandemic, the rapid shift to digital teaching and remote learning, and the resulting economic and labor market disruption, along with the increasing uncertainty, complexity, and potential turmoil that societies were already experiencing prior to the pandemic, the importance of academic leadership and strategic renewal of education has been emphasized. Several major reforms of Thailand's university system have been accomplished in recent decades. In the immediate postwar era, enormous expansions of universities were undertaken to meet the demands created by fast industrialization, expanding

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welfare state goals, and the Cold War in particular. They accomplished this via the modernization and reorganization of research financing, as well as increased mobility between universities and society organizations like as businesses, government agencies, and hospitals. Thailand ‘s neutrality throughout the Cold War and its entry into international markets were secured as a result of this.

**Keywords**: Challenges, Education Disruption, Academic Renewal, Thailand University

# ความท้าทายของมหาวิทยาลัยในประเทศไทย ในยุคการศึกษาหยุดชะงัก

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## บทคัดย่อ

การศึกษาระดับอุดมศึกษาในประเทศไทยกำลังอยู่ในช่วงของการเปลี่ยนแปลงครั้งสำคัญ แม้ว่ามหาวิทยาลัยที่มีอายุเก่าแก่และมีชื่อเสียงกว่าอาจได้รับผลกระทบจากการเปลี่ยนแปลงเหล่านี้น้อยกว่าหรือได้รับผลกระทบช้ากว่าสถาบันอื่น ๆ แต่ปัจจุบันมหาวิทยาลัยทุกแห่งล้วนมีความพยายามที่จะปรับตัวและเปลี่ยนแปลง ซึ่งอาจท้าทายสำหรับสถาบันขนาดใหญ่และซับซ้อนที่มีประวัติและชื่อเสียงที่แข็งแกร่ง อาจตอบสนองการตอบรับทั้งภายในและภายนอก แม้ว่าระบบมหาวิทยาลัยของประเทศไทยจะมีเสถียรภาพ แข็งแกร่ง และทำงานได้ดีในหลายด้าน แต่บทความนี้เป็นผลจากการที่ประเทศยอมรับว่ามหาวิทยาลัยอาจขาดความสามารถในการปรับตัวในเชิงกลยุทธ์และเชิงสถาบันที่อนาคตต้องการ เนื่องจากการระบาดใหญ่ของ COVID-19 การเปลี่ยนแปลงอย่างรวดเร็วในการสอนดิจิทัลและการเรียนรู้ทางไกล และการหยุดชะงักของเศรษฐกิจและตลาดแรงงาน ควบคู่ไปกับความไม่แน่นอนที่เพิ่มขึ้น ความซับซ้อน และความวุ่นวายที่อาจเกิดขึ้นที่สังคมเคยประสบมาก่อนการระบาดใหญ่ ความสำคัญของความเป็นผู้นำทางวิชาการและการต่ออายุเชิงกลยุทธ์ของการศึกษาได้รับการเน้นการปฏิรูประบบมหาวิทยาลัยของประเทศไทยครั้งสำคัญหลายครั้งได้บรรลุผลสำเร็จในทศวรรษที่ผ่านมา ในยุคหลังการระบาดของโควิด-19 นี้ มหาวิทยาลัยจำนวนมากต้องปรับตัวเพื่อตอบสนองความต้องการที่เกิดจากการพัฒนาอุตสาหกรรมด้านเทคโนโลยีอย่างรวดเร็ว เพื่อบรรลุถึงความทันสมัยและการปรับโครงสร้างองค์กร เช่นเดียวกับการเคลื่อนย้ายที่เพิ่มขึ้นระหว่างมหาวิทยาลัยและองค์กรทางสังคม เช่น ธุรกิจ หน่วยงานของรัฐ และโรงพยาบาล

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## Introduction

Thailand's current educational system has significant difficulties with research. The majority of students lack the ability to think analytically or to use their abilities for the greater benefit of the world. In addition to the nation, While the majority of students' study and practice memory and reading for examinations, they are not provided with opportunities to develop or improve in order to adapt to an ever-changing environment. While the study's objectives highlight the critical nature of establishing a research university, they equally emphasize the critical nature of creating a research university at all levels: student, faculty, and university to achieve achievement via research at the very least, collaboration from four essential sectors is required, Universities as a source of qualified employees and specialized information Government, which may be the one who selects the research issue from the country's difficulties and research budget sponsors; business sector, which will benefit from research and innovation by assisting in the resolution of problems; and community, which is representative of the true problem. As a result, research must be conducted in order to reach the community. Of course, in order to do high-quality research, both human and financial resources are necessary. This, in the context of Thailand's limited financial resources, is particularly important. Alternatively, the money may be dedicated to things that the government deems to be more vital. As a result, the funding for research work is significantly reduced.

Conducting studies and taking part in issue solutions at a national or private sector level This is a scholarly service. This is one of the instructors' missions, in addition to educating and producing graduates. Thailand's universities are increasingly aspiring to become research institutions. with increasing education beyond a bachelor's degree to graduate courses, which is another step forward. The university serves a variety of functions, including teaching and research. Simultaneously, education is both a role of the university, such as basic education, and the establishment's training of individuals for employment. Certainly not the university's primary function. There are two types of research: university-based and non-university-based. Institutions of higher learning may undertake research exclusively independently of the study. or outside of the university Certain universities may aspire to be teaching institutions rather than research institutions. The difficulty is that there is a university that is devoted to research in order to advance information, to practice tests, and to share a comparable intellect. Modifications to

the definition of a research university. It should be an adjustment to the fundamental principles of education in such a way that education and research complement one another and improve the quality of both. Thus, research-based education should be carefully evaluated. Thailand's higher education system has grown by emulating the Western model. The emphasis is on developing a body of knowledge that can be transferred for practical use. Education is founded on faith. It is contributing and constitutes knowledge or verifiable truth in terms of what constitutes knowledge, studying through lectures or texts, with sufficient listening, memory, and memorization. It is the attainment of that higher education that may be quantified by lecture attendance. Then in the test, revise the phrase. Who has listened extensively, and remembered extensively? is a well-educated individual. There are instances when information is comprehended and may be applied in a variety of contexts. If we consider the current state of science, which is characterized by large quantities and rapid change, as well as the current state of society, which is characterized by diverse conditions and rapid change, education aimed at developing cognitive memory and adaptation will not suffice for graduates who must live in the present and future worlds. It must be adjusted to achieve better outcomes, competencies, potential, and attitudes that have been selected and established by each institution.

The existing teaching and learning methods are inadequate. It might be considered the initial step toward numerous more advanced levels. The research process is a study instrument that has the potential to provide a variety of desired traits. Education must adopt a research-based mindset. Change from belief to intelligence founded on data and reasoning, critical, analytical, synthetic, creative, and innovative thinking can occur at various stages of the research process, including access to knowledge, reliability assessment, valuation, model development for usability, and power independent thinking and being yourself. It may be utilized as an educational tool in any way.

## Why Is It Critical for a Country to Have Good Universities?

Although Thailand's universities have been gradually deregulated over the last three decades, they remain part of a politically-controlled public sector. This has provided a stable funding base that has, for the most part, been used in a countercyclical manner: during economic downturns and periods of higher unemployment, governments

(regardless of political affiliation) have tended to invest in increasing access to higher education and training opportunities (Ford, 2015). Meanwhile, universities sometimes face overregulation and a lack of institutional autonomy. Thailand universities are not permitted to function as distinct legal entities when it comes to construction, money, or intellectual property ownership, nor are they permitted to participate into legal agreements or some foreign partnerships. In addition to the previously noted swings in government attention and ambition, they must negotiate between state dependency on the one hand and relative institutional autonomy on the other, which may be a difficult task. According to Ross (2016), some critics, this has resulted in institutional lock-ins in which institutions are neither forward-thinking nor experimental enough. During an open society, free media, democratic rights, independent courts, and autonomous universities all serve as cornerstones. Independence of scientific exchange, as well as an environment in which scientific viewpoints, theories, and findings can be openly scrutinized and critically reflected upon, are prerequisites for finding solutions to national and global challenges in a world where such institutions are under attack and in danger of being undermined (Brown, 2019). However, Schwab (2016), universities must integrate their basic two objectives, instruction and research, with social dynamics in order to preserve and reinvent themselves. Basic curiosity-driven research as well as research that directly tackle social concerns is required for sustainable societal growth, and cooperation and co-creation with other actors in society are essential components of both types of research. The distinction between curiosity-driven and problem-driven research should not be overstated. Regardless of the relative balance, research policy must promote quality and global excellence. Investments in research and higher education are vital for a small, open knowledge economy like Thailand to preserve and grow its wealth, competitiveness, and global position. The phrases independence, quality, and relevance must be the watchwords of research and educational policy. There are two aspects that are critical to the long-term success of institutions. The first is on the role of universities in society. Thailand's universities must improve their formal institutional autonomy in respect to the state as well as their capacity to make autonomous strategic choices. Furthermore, higher education and research must be done in a manner in which academic independence and integrity are consistently asserted and supported in order to best contribute to addressing global issues and preserving sustainable social growth.

However, it is also about removing tangible barriers that prevent institutions from participating in many forms of partnerships on a national and worldwide level. Independence and interaction are mutually reinforcing characteristics of world-class colleges and are a cornerstone of democratic society.

The second long-term success aspect is that universities are able to strengthen their capacity for strategic renewal in terms of what they do, how they do it, whom they do it with, and the financial foundations of their operations. These challenges are especially significant in a system that is publicly financed and regulated, but is supposed to be globally leading, visible, and a contributor to capacity development in a society with expanding welfare responsibilities and a reliance on global markets (Gog, 2013).

## Education Disruption Causes the University Need to Change

The systems of higher education as universities has been facing the education disruption and they need to develop their curriculum and it must not only provide high-quality instruction and research, but they must also be seen as relevant and beneficial by the general public. Graduates need to have the sorts of knowledge and skills that are useful for both the short- and long-term labor market and society, and research findings must be widely disseminated (Frey et al., 2013). New information and communication technologies, a quick process of digitalization, as well as new demand patterns and student learning methodologies, are transforming the way research is conducted and, more importantly, the way higher education is offered in this country, both factors, as previously said, offer difficulties. As a result, the focus of this article will be on how universities should respond to these developments, as well as what kinds of academic cultures and leadership are conducive to such transformations. This is not a small matter, and there are multiple completely valid strategic alternatives. One method is to go on a path of dramatic change. This technique is widely supported in some areas, mostly outside academics. Its underlying premise is that society and technology are changing at such a fundamental and fast pace that universities must adapt in response to these revolutions, just as they have done in the past. Increasing interdisciplinary in research and teaching, developing new study programs, experimenting with new pedagogical approaches, and placing a greater emphasis on problem-driven research and innovation are all part of the transformation agenda. Additionally, it often incorporates notions about the need

for new forms of governance and leadership, based on the premise that the inherited paradigm of college self-organization is intrinsically conservative and so outmoded (Brown et al., 2018).

Alternatively, by further reinforcing their fundamental ideals and distinguishing qualities, universities may expand their position in society and contribute to the advancement of society. Even while this technique is more often promoted inside colleges and might be seen as inward and backward oriented, it should not be dismissed as such without more consideration. Its fundamental rationale is that in uncertain or disruptive times, when populist movements and authoritarian regimes cast doubt on or even deny the value of scientific and scholarly knowledge, it is more critical than ever to defend universities' fundamental role as an independent, stable, and critical voice in society, and to strengthen academic core values of independence, autonomy, and integrity. As a result of this latter paradigm (Brown et al., 2018), the role of the university is primarily to cater for the long-term provision of new generic knowledge as well as to provide higher education through which students acquire general academic skills such as advanced proficiency in reading and writing, analytical thinking, and critical reflection in addition to up to date, scientifically based knowledge in specific subject areas. Chantarasombat, Sombatsakulkit (2021), the educational benefits of spending formative years in a university environment, getting to know fellow students from a variety of backgrounds and study areas, and participating in extra-curricular activities lend further support to the argument that traditional campus-based study programs have a future in an era of massive digitalization and globalization. Additionally, since the future is unpredictable, both the research portfolio and the technology offering must be safeguarded. Just as biological variety serves as the "gene pool" for future invention, knowledge diversity serves as the "gene pool" for future innovation. Despite the fact that universities aren't the only institutions in society that produce new information, they are perhaps the most significant and systematic "curators" of this large, diversified, and ever-developing knowledge base. As long as there is no presumption that any of the primary techniques or opinions is better than the others, they merit careful consideration. When stated boldly, as in the example above, they emerge as irreconcilable extreme points or ideal types. In truth, every approach will include a combination of the two. It is more useful, we feel, to begin with a discussion about which aspects of today's universities should be kept and which should be

lost rather than arguing that everything must change or that nothing must change (Freeman and Louca, 2001).

## Thailand's Research Universities Face Unusual Obstacles

Universities in Thailand have historically seen significant shifts in their approaches to teaching, research, and cooperation, the relative stasis that defines Thailand's higher education system seems odd. Thailand's universities faced concurrent developments of modernization and growth in the early postwar period meet expanding educational demands and the necessity to align with the developing "welfare-warfare" state. There were two major government commissions involved in the latter: the 1945 university deliberative and visionary commission and the 1955 commission, which proposed radical measures to ensure that Thai universities were prepared for rapid growth in youth cohorts and the corresponding expansion of societal needs. It advocated for a shift away from tiny professoriates toward departments with a clear division of labor between teaching and research-intensive professors (Donpraipan, 2013). Simultaneously, the system of research financing evolved from a relatively primitive framework, with the establishment of a succession of research councils dedicated to certain fields and goals (Stevrin, 1978). All of these councils had a wide range of agendas, including strengthening Thailand's military (an atomic research agency), advancing the country's economy (a building research council), modernizing agriculture (a agricultural research council), expanding health care (a medical research council), and enhancing public services (a medical research council), (councils for the humanities and for social science, respectively). Universities in Thailand in the 1960s became three times larger than they were in 1945, and their roles and responsibilities were restructured as a result. In the postwar modernization of Thailand, they had grown from insular professorial fiefdoms with infrequent (though acute) social link points. This feat was accomplished without significant reorganization of university governance, which had remained largely intact with the academic oligarchy well entrenched. Rather than that, an elite combination of businessmen, public employees, and intellectual leaders accelerated the change

During the late 1960s and early 1970s, when Thailand universities underwent another major revolution, this time under the flag of relevance and resilience, the power structure of Thai universities underwent a significant alteration as well. In this era,

the spectacular development of the postwar period was coming to an end, and new mechanisms to ensure that what universities produced was in line with what society required were being defined. With the incorporation of vocational schools into universities, the teaching mission was considerably expanded, and research funding flourished fast and extensively in fields well outside the academic core (working life, substance abuse, renewable energy, just to mention a few areas of interventions (Srnicek, 2017). This time, decision-making procedures were overhauled, resulting in a complicated system of debates about educational requirements and desires. In the 1990s, a financial crisis in Thailand and a seismic shift in global economic and political connections (dubbed "the end of history") prompted Thailand's universities to reevaluate their missions and methods of operation once again (Samersak, 2005). A new focus on resource competitiveness and worldwide audits of quality, a decentralization of educational planning, and notions of universities as self-organizing networks of actors, interests, and resources, under the banner of "freedom," characterized this era of research financing. There has been a progressive shift from the official leadership levels of Thailand universities to strong research groups and constellations that rise financing for research, employ and plan without much articulation of the formal leadership level. Every solution brings with it a new set of issues. The 1990s' freedom revolution increased the efficiency and flexibility of personnel and requirements, but it also sparked an entire industry of evaluations and assessments to ensure that flexibility also led to greater quality. What we learn from international evaluations of the quality of research at Thai universities, such as government grants, private funds and university grants but also from the aforementioned government commissions, is that universities have adapted quickly at the micro level, with research groups and constellations dependent on external funding, but that there is a resulting acuity at the macro level, where university leadership retains significant funding and power, but with an unclear relationship to it. University leadership has substantially communicated the notion that duties and resources should be devolved to lower levels, and has ensured that devolution is handled in a responsible manner. However, it has been more cautious in defining clear strategic directives, so as not to disrupt the ground-level adaptive processes. The vast majority of grand challenge programs and the like have been treated with in this way, as if they were just another source of financing rather than an invitation to fundamental change (Chantarasombat, Sombatsukulkit, 2021).

## What Are the University's Choices in the Midst of This Disruption?

Thailand's universities are now influenced by all three of these change modes: strong research groups, an emphasis on democratic discussions. At the moment, social relevance and resource flexibility are important. They now need to reconcile and hone them in order to face the present malaise and the need to participate in and even lead change-oriented coalitions in Thailand and elsewhere. Which difficulties are they confronted with in this location? When it comes to education, Thailand's universities confront a variety of obstacles. Traditionally, the educational offerings of universities are molded by a mix of external signals or demand from business, the public sector, or the government, as well as the research profiles and capabilities of the school. Path dependence also plays a vital role in practice. As one university president of a prominent Thai institution put it, "education is one of the most difficult things to update at a university." (Chantarasombat, 2018). In one sense, education is always being renewed, with instructors constantly revising course curricula or teachers and departments producing new courses or academic programs. In another sense, education is constantly being renewed. Several factors, however, obstruct a more systematic or deliberate renewal of education in Thai institutions. Thailand's universities, as previously stated, are took very little or prohibit from either Thai students. Rather than that, they get public funds for instruction. It is distributed according to a complex system, with each institution receiving an annual "maximum amount" depending on the number of students it accepts and the academic performance of those students do (in terms of finalizing courses), (Chaimayo, 2016). To further complicate matters, students in various faculty areas are rewarded differently, with students in departments such as humanities and social sciences being expected to pay less than students in fields like as science and technology, and so on. It's possible for each university to make its own educational decisions, but there is a limit or cap on the maximum amount of financing it may get depending on the number of students it accepts and how well these students do (in terms of finalizing course). To further complicate matters, students in various faculty areas are rewarded differently, with students in humanities and social sciences being expected to pay less than students in science and technology, etc. The educational offerings of the universities within this framework are in essence completely up to them, but there is a limit, or a cap, on the amount of money they may get from the government in total. In this paradigm, the overall number of students is decided

by the cap and the mix of students in various academic areas. A university may approach the limit by enrolling more students in "cheap" courses and programs or by enrolling fewer students in more "expensive" courses and programs. What this implies is that appealing colleges that provide education to the maximum extent possible have no motivation to establish new courses or programs, since they can only do so by lowering or eliminating current ones. The latter entails internal talks that are often challenging. The huge growth in competitive research funding has resulted in the creation of research settings that are not organically associated with teaching. An examination of the government's 2008 attempt to identify and finance a number of key research areas was harsh in its assessment of the sectors' contribution to teaching and education (Ross, 2016).

A number of reasons, some of which are stated above, contribute to what Donpraipan (2013) define as an increasing bias in favor of research at Thailand's largest research institutions. They note, after analyzing current developments, that: We discover that Thailand's universities have placed a heavy focus on research at the cost of teaching, which has had an unsettling impact on teaching quality and Thailand's worldwide desirability. This article bias is justified in part by the fact that academic performance is often linked with research brilliance in Thailand, overlooking the critical role of teaching. Additionally, it demonstrates and undervalues the critical role of students, and hence education, in determining the competitiveness and innovative ability of regions and nations. Along with an increased focus on research at the cost of teaching, we are seeing a growing disconnect between teaching and research, which is detrimental to both pursuits. One of the differences between the Thai and other nations' systems is that publicly sponsored research is more concentrated in universities (as opposed to research institutions), whereas teaching seems to be more isolated from research. We would argue that the way teaching is paid, rewarded, evaluated, and regarded does not support education's strategic renewal. Additionally, several departments hire academic employees largely on the basis of their research capabilities, and many do not engage in teaching. A government inquiry into the leadership and governance of Thailand universities reached a similar conclusion, stating that the Thailand funding system's quantitative approach, with government funding for education based on "performance metrics for educational volume" (as described above), does not incentivize universities to improve educational quality or differentiate themselves through attractive, new educational

offerings. As a consequence of universities concentrating on comparable courses and study programs, the effect is “a uniformity of the complete spectrum of courses and study programs across Thailand,” which maximizes government appropriations.

The committee recommended a rethink of the tertiary education finance structure that would allow and incentivize institutions to engage more strategically on education renewal by distinguishing their educational programs and profiles. The government inquiry’s conclusion is reflected in the following comment from a vice chancellor for research: “we are doing the same thing as everyone else, therefore we must be doing it correctly.” The issues that Thailand’s big research institutions confront in terms of strategic education renewal. We do this by recognizing both strong and weak indications and drivers of educational renewal. Thus, the educational offerings at Thailand’s universities are heavily influenced by government funding models, rules and regulations, the skills and attitudes of current faculty and students, internal models for allocating resources to courses and programs, and, as a result, traditional modes of teaching. In comparison, contemporary university education is generally and naturally less impacted by prospective faculty or students and the needs, abilities, and preferences they may bring to the table. The same is true for social requirements, knowledge and skill developed outside academics, and innovative teaching methods and formats. By “new forms and formats of teaching,” we mean both the potential created by digitalization, which far outweigh distant instruction, and more modular forms of education that are well-suited for lifelong learning offers (Inruengsri, 2011). It demonstrates the present system’s significant path reliance. Inherently, path dependency is not negative. It may be perceived as guaranteeing stability or as causing inertia or even ossification, depending on one’s judgment. However, we would argue that in times of social upheaval and growing societal issues, there is a case to be made for attempting to strengthen the weak signal found in our table.

## Disruption Factors and Factors for University Adjustment

The fundamental characteristics of universities in general, and comprehensive research universities in particular, as a springboard for a discussion of the changes that are necessary to best prepare students for the major societal challenges and labor market of the future. For a minute, consider what comprises “the university as we know it” and how it is certain to change. In most nations, universities have an inherited structure that consists

of a variety of traits that, taken together, indicate the institution's mode of operation. One such feature is the gradual development of more specialized academic disciplines that have become highly institutionalized over time, both inside universities (by the establishment of specialized academic positions, study programs, and departments) and outside universities (through the emergence and proliferation of national and international professional organizations and specialized conferences and journals). This is a worldwide tendency that has lasted decades. We believe Thailand is one of the most structured nations in the world for conventional academic fields. One of its characteristics is that students are often pushed into relatively limited academic areas and vocations early in their education, in contrast to the aforementioned goals of generic skills and wide educational offers, such as the liberal arts education model (Susskind et al., 2015).

A second significant trait is the highly controlled and specialized academic recruiting and career structure that exists in the majority of nations. This is a highly meritocratic system aimed to foster academic excellence and ensure that each person, via the use of external peers in recruiting and promotion procedures, achieves criteria that are of a high national and/or worldwide caliber and merits advancement (Suang, 2006). This system has issues with valuing information and skills gained outside of academia, and it does not encourage movement between the academic and non-academic sectors. While Thailand's academia shares these characteristics with other systems, it also strikes international observers as having a less transparent career structure, slow recruitment processes, and a high degree of internal recruitment, in the sense that it is quite common to pursue an academic career at the same university where one received their academic training. Additionally, observers remark a dearth of strategic recruiting. Among the most fundamental features of a collegiate governance and leadership structure is the need that decisions involving academic judgments be made by those in positions of academic authority. As a consequence, academic leaders are seen as interpreters primus, and the majority of judgments are reached after collegiate discussions. This does not prohibit instances of proactive leadership, but they are more often than not the result of omission than conduct. A distinguishing aspect of Thailand, which is also shared by the other Asian nations, is a strong history and regulation of student engagement in university governing bodies. Peer review and peer discussion in all kinds of academic contexts such as committee work and external peer review for review for recruitment, research funding

and examination or publication are all important parts of an academic quality culture where the idea that quality is best assessed and enhanced through peer review and peer discussion in all kinds of academic contexts is the underlying principle. All three are also critical for the autonomy and academic integrity of universities. By stating that academic matters should be decided by the most competent academics, political, economic, religious, and other influences on research and curriculum may be minimized. Of course, the potential downside of these university characteristics is that they may cause institutions to become excessively introverted and static, making them less receptive to signals of changing trends and needs in society, relying heavily on rigid academic qualifications while ignoring societal relevance, and failing to recognize the value of collaboration with stakeholders outside academia or working to ensure that research results are utilized in industry. Finally, it is sometimes stated that collegiate models of administration and leadership have a weakness when it comes to allocating resources to novel forms or fields of research or instruction. The real challenge, from this vantage point, is to find ways to not only maintain but actively strengthen the quality-enhancing mechanisms, the pursuit of academic excellence, institutional autonomy, and academic integrity that are inherent in today's university culture, while also increasing the openness to external mandates and working more systematically to increase the capacity for renewing technology and research (Chantarasombat, 2018).

## How to Make Colleges and Universities Self-sufficient and Flexible

In and of itself, academic leadership is a difficult challenge. However, high-quality research and teaching in academia depend on the presence of academics who are self-assured and independent, who possess a wide range of knowledge and expertise, and are willing and able to assume responsibility for their own work as well as for the advancement of the larger academic community to which they belong. In order for this to work, there must be a culture in which employees are encouraged to take initiative from the bottom up (Brown et al., 2018). Teaching others what to do and how to accomplish it is not an important part of academic leadership. It's rather an issue of putting in place procedures that encourage the organization to come up with fresh and creative approaches to research and teaching. Many Thai research universities have academic heads recruited via collegiate procedures, and it is critical that they be given

a clear mandate to promote growth and renewal, in addition to protecting integrity and quality. The principles proposed by Rifkin (2014) can be used to generate what they call "agile leadership," i.e., anticipating and articulating future needs and trends in order to build collective understanding and support for action, as well as creating conditions that allow for continuous learning and as many adjustments as necessary, in order to achieve this end. Finally, good academic leadership requires accountability, transparency, and openness to criticism and feedback (Frey and Osborne, 2013).

- **Enhance the drivers of education renewal.** The first step is to identify and attempt to reform those financial models and procedures, imposed by the government toward universities but equally crucial between various levels within the institutions themselves, that act as disincentives for change. As a result, the goal should be to become more sensitive to current social trends and to speed the translation of high-quality research into high-quality educational programs (both for undergraduates and graduate teaching and for lifelong learning). One way to strengthen the signals coming from the outside world about what is expected of tomorrow's leaders and specialists is to open up additional communication channels. One way to do this is to strengthen connections with alumni, professional associations, as well as labor market groups.
- **Improve the long-term circumstances and frameworks for success.** University growth and prosperity may be achieved within this framework. Government-academia interactions in publicly supported institutions of higher education and research are another terrible issue that has to be addressed. Government officials have a strong incentive to ensure that public funds invested in higher education have the intended societal benefits. Political organizations that grant big public funds for higher education have a major difficulty in convincing them that less detailed governance and steering generates better and more beneficial outcomes. Just as academic leaders should encourage change and innovation in education and research instead of prescribing exactly how professors should do their jobs, the government should do the same, i.e. set targets in broad and general terms of "what" universities are expected to "deliver," but refrain from detailed regulation of

"how" they go about doing it. Contracts between particular institutions and the government, where universities specify long-term objectives and assessment sites, in cooperation with the government, set long term goals and evaluation criteria, might work. If universities were given more autonomy than they presently have in Thailand, then this might be possible. There must be at least two parties involved in a contract in order for it to be a contract at all; otherwise, there is no contract.

- **Ensure that colleges and their students have a delicate symbiotic connection**. Universities fight for rankings and reputation, as well as for students, staff, and research funding, in order to maintain a high level of academic excellence. When it comes to forging political alliances, participating in collaborative learning activities, sharing infrastructure, developing joint teaching programs, and bringing together students from across the world for student exchanges, they have a lot to gain by cooperating on a national and international level. Although the amount of competition may be beneficial, governments and academic leaders should encourage more cooperation amongst universities as a means of promoting the branding and distinction of institutions. Not all universities' research, teaching, and engagement with society will be limited by the process of profiling or distinction. When it comes to fostering innovation, it's more about promoting experimentation and fostering the constant creation of new and better methods. To prevent system and institution ossification, it is important to promote dynamic divergence and renewal. Despite this, it is also normal in a competitive university environment for good ideas to be adopted and adapted by other institutions. This is a good thing. Continuous renewal occurs when the pendulum swings between successful localized testing and system-wide spread of the innovations that arise.

## Conclusion

For universities, this is a once-in-a-lifetime chance to galvanize support (from both inside and beyond academia) for transforming themselves in order to better serve society's transformation. As a result, universities would be better able to establish themselves as autonomous curators of knowledge (creation, usage, and cooperation).

With it, we can ensure that universities can continue to generate high-quality research, while also preparing society to deal with today's complexity and unpredictability while also enabling us to design the future we desire. The universities' role as proponents of international cooperation and the global enterprise of science would continue to provide a counterbalance to the present tendency toward nationalism, protectionism, and isolationism. It is vital that this historic chance to restructure universities is not lost for the good of universities and for the benefit of society. There are a few ideas for colleges and the government that might help them keep their basic beliefs while maintaining their legitimacy, identity, and autonomy in a complex and chaotic global environment. Similarly, we contend that the current economic crisis offers a once-in-a-lifetime opportunity and impetus for academia to reinvent itself, strengthen collaboration across faculties and disciplines, develop new models for lifelong learning, and embrace digitalization as a way to improve educational quality and reach while also expanding the social role of universities.

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# Foresight in Thailand: Some Development and Underpinning Theories

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## Abstract

This paper aims to depict the history of foresight programs in Thailand, their development, and current practices in proportion to the global foresight landscape and their underlying epistemologies. The objective is to bring awareness to the historical development of future studies, investigate the underlying epistemology, moral and ethical foundation within the discipline. The findings indicate that it is important to make explicit our philosophical presupposition, as it reflects on the direction of foresight practice and tool selections for foresight practitioners in Thailand.

**Keywords**: Futures Studies, Foresight Theory, Ethics, Critical Thinking, Narrative Foresight

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# ภาพรวมและปรัชญาของอนาคตศึกษาประเทศไทย

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## บทคัดย่อ

บทความนี้มีวัตถุประสงค์เพื่อ อธิบายประวัติความเป็นมาของอนาคตศึกษาในประเทศไทย โดยรวบรวมข้อมูล พัฒนาการและแนวทางปฏิบัติในปัจจุบัน วิเคราะห์ถึงญาณวิทยาที่แฝงอยู่ และนำไปเทียบกับแนวทางปฏิบัติของอนาคตศึกษาทั่วโลก เป้าหมายหลักของผู้เขียน มุ่งไปที่การสร้างให้เกิดความตระหนักรู้ถึงประวัติความเป็นมาของอนาคตศึกษา การสืบค้นรากฐานทางศีลธรรมและจริยธรรมที่อยู่ภายใต้กรอบความรู้ สะท้อนให้เห็นถึงสมมติฐานทางปรัชญาที่ชัดเจน และมีความสำคัญต่ออนาคตศึกษา เนื่องจากเป็นรากฐานที่สำคัญในการกำหนดทิศทางในอนาคตของการพัฒนาอนาคตศึกษาและช่วยในการเลือกเครื่องมือที่เหมาะสมสำหรับผู้ที่จะออกแบบและนำไปใช้จริง

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## Introduction

Foresight (similar to future studies) is known today as an activity to create knowledge of the future. COVID pandemic in early 2020 and its unforeseeable impact on the global population confirms that we live in a VUCA world full of volatility, uncertainty, complexity, and ambiguity (*Volatility, Uncertainty, Complexity, and Ambiguity,* 2020).

Organizations are forced to step forward, react to unexpected events or disruptions, and develop an anticipatory capacity for strategic planning. Foresight capacities have been adopted in public sectors, mainly to find solutions and strategies for policy-making. However, the application has been limited to its utility in forecasting and preparation for extrapolated demand. The crucial missing element is its underpinning philosophies behind our future studies or foresight practices. Understanding this can change the problem framing which has a potential to shape the future of our country.

The paper outlines Thailand's foresight landscape in six sections, as follows:
Hindsight: Brief history of foresight in Thailand
Onsite: Current foresight practices
Insight: Theoretical basis of foresight
Oversight: Overlooked aspects and limitations in foresight workshop
Resight: Re-evaluating the vision of foresight
Foresight: Alternative foresight tools for the future of Thailand

## Hindsight

Thailand's futures study can be dated back to 1975, as seen in the academic research by Dr. Somporn Sangchai, title "Some Aspects of Futurism." Sangchai (1975, p. 39) emphasized that "Planning has become the other side of the coin for futurism." Consequently, its connection to the present might be an obstacle of seeking alternative futures or actions. A few years later in 1978, another academic research on "Cultural futures for Thailand: The ethnographic enquiry" was conducted by Robert Textor, who outlined an ethnographic and cultural approach to show a widespread agreement among the interviewees, particularly on the possibility of large-scale violence in Thailand in the 1980s (Textor, 1978, P. 347-360). These two pieces of work provide some invaluable insight the foresight of futures work in Thailand.

Twenty years later, APEC Center for Technology Foresight was established in 1998 by Dr. Yongyuth Yuthavong and hosted by the National Science and Technology Development Agency of Thailand (NSTDA). The aim was to equip APEC Economies with planning tools and prepare for rapid change and major societal challenges. The dream team--Dr. Nares Damrongchai and Dr. Chatri Sripaipan--put together the book "A Decade of Foresight: Technology Foresight in Asia-Pacific, 1998-2008". Since then, APEC has continued to produce Foresight reports in various dimensions, such as water, energy, and emerging diseases.

In 2006, Dr. Chulakorn Masatienwong, Ministry of Education, published a research paper on "The Foresight of Education Policy and Strategy for Thai Children." (นโยบายและยุทธศาสตร์ทางการศึกษาแบบมุ่งอนาคตเพื่อเด็กและเยาวชนไทย). The majority of foresight tools implemented in Thailand were selected to forecast the technical changes, supporting organizations' policy design and agenda-setting. Until 2010, foresight in the public sector was limited to a strategic plan, concentrating on science, technology, and education.

A breath of fresh air seemed to blow through Bangkok when foresight application expanded to address social problems in Thailand. Adam Kahane was invited to conduct a Transformative Scenario Planning workshop in August 2010 in the midst of political division among Thai citizen. A prominent conflict mediator and facilitator of Montfleur negotiations and Peace Negotiations in Columbia, Kahane and his team aspired to offer the first collaborative foresight workshop on Thailand's politics (Kahane, 2012).

Amid political division, his team brought together 35 political, civil service, business, trade union, and NGOs to have a dialogue on "How Thailand will be passed on to our descendants." The attempt was to create the possibilities for what Thailand might look like over the next 25 years. His communication strategies and plans yielded three scenarios to be completed in the following 18 months. What might have been the major step towards a groundbreaking deliberative process in Thailand was unexpectedly and prematurely terminated by the military coup in May 2014. The junta was established to govern the country, declared martial law, censored the media, and detained politicians and activists—including some participants.

## Onsite

Fast forward to 2016, Thailand 4.0 scheme was unveiled by the military government, with an announcement published in the Royal Gazette. It was an ambitious attempt to transform the agricultural-based economy to the high-tech industry and innovation, bringing value-added products and services.

In 2018, Dr. Suvit Maesincee, while serving as a Minister of Higher Education, Science, Research, and Innovation, supported the Ministry of Higher Education, Research & Innovation (MHESI) establishment. The new ministry merged the existing Science and Technology Ministry, Office of the Higher Education Commission, the National Research Council of Thailand, and the Thailand Research Fund. It aimed to support Thailand 4.0 policy by developing high technology, enhancing R&D efficiency, and developing human resources for future demand.

"Blueprint for Change" outlines the new organizational structure within the administrative government. MHERI's mission gears towards the previous government's bureaucratic reform. Its main objective is to promote business related research, and plan human resources for future demand and develop business innovation (Theparat, 2019). Foresight was integrated as a mission under the Policy, Plan, and Budget departments, within this Ministry. In addition, during True Business Forum 2018: The Digital Future to Sustainability, Dr. Suvit Maesincee highlighted the "game-changer" of shifting from "economic growth" to the "thriving in balance" paradigm. To "define the future" of Thailand, he emphasized the three mandates: 1) Locating the "future setting" for a better society, 2) Creating game changers, and 3) Collaborating between public and private sectors on "innovative capacity" for transformative change into Thailand 4.0. His core message focused on the need for a new mindset, from fears about the future to taking control and daring to look into the future. (Thailand Publica, 2018)

Acting on the 10$^{th}$ guideline on a 20-year National Strategy, The National Innovation Agency (NIA) has become the spearhead of foresight activities, commissioning various futurists, incorporating foresight for innovation mission, and creating a network of major stakeholders and enthusiasts in recent years. One of the activities hosted by NIA is the Public-Private Chief Innovation Leadership. This policy lab brings together participants of diverse backgrounds and utilizes foresight tools in the policy design process.

IFI—Innovative Foresight Institute was established under NIA, with the following objectives: 1) Mapping society trends. 2) Support and develop futurist network 3) Encourage policy design by incorporating foresight tools. 4) Promote Foresight for the organization's strategic planning.

Besides, NIA also provides workshops for the public with the support and collaborations from many academic and education institutions, namely, National Institute of Development Administration (NIDA), Thailand Futures Foundation (TFF), Institute of Public Policy and Development (IPPD), Chiang Mai University, School of Public Policy, (CMU-SPP). The initiative drives the popularity of foresight concepts and increasing interest within the government sector.

NIDA and TFF are currently very active in offering government institutions workshops and are expanding their clout through the network and word-of-mouth among policy decision-makers. Their main focus is to manage uncertainty and proactively cope with these events. Each team consists of a few key agents who design programs to provide solutions for the contracting institutions.

Along the same line, under the Office of National Higher Education Science Research and Innovation Policy Council (NXPO), Futures Setting is listed as the first among seven operation directions of the organization. Lifelong learning and futures skill set are indicated as a program *"improving knowledge, skills, and competencies of the current and future workforce to meet the demand of industry that is continually faced with technological disruptions"* (NXPO, 2022). In June 2020, NXPO hosted a foresight workshop on "Safe City" and invited a group of policemen from all parts of Thailand to collaborate on technology and policy design.

At Chulalongkorn University, hosted by the Faculty of Architecture, a social lab was created to understand our society's future: how people live, work, get education, travel, communicate. The time horizon of 20-30 years is applied to forecast the future society, which helps with urban planning, space occupation, and utilization.

Thailand's first foresight book was published in 1983 by Nattaya Pilanthananont (Pilanthananont, 2007). However, in recent years, the most notable publications are by the three following institutions and authors:

1. Thailand Future Foundation: “Futures Thinking”, promoting foresight and supporting the movement towards Thailand 4.0.

2. Innovative Foresight Institute (IFI), National Innovation Agency (NIA), and Thammasart University: “Foresight Tools”, providing foresight tool box for policy design.

3. Associate Professor Apiwat Ratanawaraha: “Futures Study”, showcasing 18 foresight tools and explaining his foresight experience and practical knowledge in Thailand (Ratanawaraha, 2020).

An increasing number of government organizations adopt Foresight in their strategic planning process. The organization that have adopted foresight tools into practices include educational institutions, private and some NGOs (Figure 1). In contrast, only a small group of foresight agents move around, offering training and facilitating for multiple institutions without restriction or limitation to their own. The transboundary nature of the Thai foresight community leads to mutual learning and idea exchange. Each workshop creates new knowledge and insight, continuously accumulated and applied into the sector. These agents share information and exchange ideas, practices, and techniques, fostering organic growth within the community. So far, most foresight tools have been geared towards strategic planning within organizations. In contrast, some other useful concepts and techniques could be promoted to address different types of Thailand issues. The next section will introduce the three foresight theories, which could widen the scope of the foresight approaches known in Thailand.

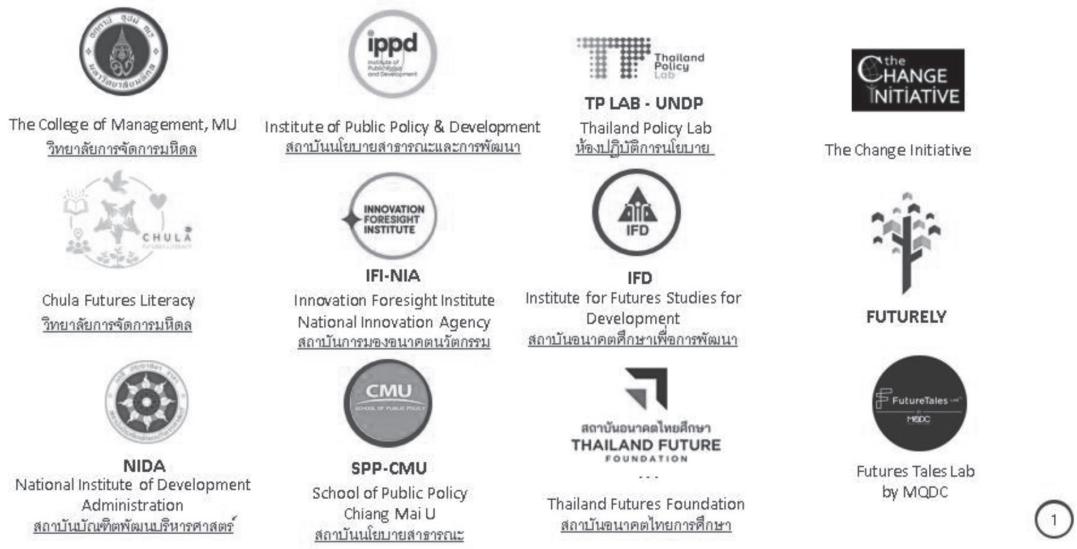


**Figure 1:** Organizations Involve with Foresight Practices

## Insight

Piirainen and Gonzalez (2015) proposed three main philosophical outlooks which influence the selection of foresight tools and implementation approaches, namely 1) (post) positivistm or empirical realism, 2) interpretivism and critical theory, and 3) pragmatism.

1) (Post) Positivists or empirical realist epistemology of foresight:

The Positivists utilize foresight tools to extrapolate the existing trend, focusing on the accuracy of the prediction. This approach is based on the assumption that the causal laws are constant and remain as such, conflicting with the reality of the uncertain and probabilistic nature of the future. Therefore the positivist sense seems like a moot point under a long time horizon because of the fluctuating nature of all the variables that created a particular outcome from the prediction (Piirainen & Gonzalez, 2015). Nevertheless, the forecasting and empirical data analysis approach have its footing mainly in science and technology. This foresight approach can be seen in the early year of the science and technology field in Thailand, as indicated in an APEC presentation—"Policy decision: Best information available + Anticipatory Intelligence = Foresight."

In modern days, big data, science, and machine learning are being incorporated into forecasting future scenarios. Their objectives are to map the trend using new research tools, such as text-mining, agent-based models, system dynamics, and sensitivity analysis.

2) Interpretive and critical epistemology of foresight:

"What appears on the surface is sometimes different than what's below." The constructivists perceive the future as an agreeable set of notions and select foresight tools to accommodate the deliberative process. They seek a deep understanding of issues and go beyond the cause and effect, as the agenda is to integrate futures from multiple perspectives within the foresight process. The in-depth analysis includes social context, cultural norm, belief system, myth and metaphors (Inayatullah, 2008). These layers of assumptions, lying underneath human consciousness, are not explicit but incessantly control human behavior and thinking system. Trying to decode the complex layers gives insight into the issue at the root cause, not just what appears on the surface. However, this foresight approach does not force a consensus, without which an immediate actionable result is missing.

The futures of "what ought to be" are derived from each individual value, not knowledge or expertise. Through the deliberative process, each participant is empowered to share their views while receiving equal value consideration regardless of their expertise.

The School of Public Policy at Chiang Mai University highlights this approach and promotes organizations to be "future-ready" by focusing on preparation for the long-term futures (20+ years). They uniquely adopted Emotional Intelligence, Empathy, Complexity Thinking, and Casual Layer Analysis by Dr. Sohail Inayatullah as one of the main tools. Problem classification (through Complexity Thinking tools) occurs early in the process to filter out the immediate actionable plan from the long-term strategy. This design allows participants to set the timeframe accordingly during the scenario planning stage. The outcome is the four plausible scenarios, for which participants jointly decide by voting on the most desirable one and planning actionable steps to reach that particular scenario. The future scenario derives from collaborative work and value set from the participant group, not from the knowledge of the expert group ("*Learn to Design your Future,"* 2020)

3) Pragmatist epistemology of foresight:

Most popular and widely adopted in Thailand is this practical approach. The pragmatists believe that any foresight method useful in producing an intended output is valid. The focus is on utility and timely actionable output, a solution highly valued by organizations. The program is implemented to achieve actionable results, not just description, prediction, or deep understanding of the future (Piirainen & Gonzalez, 2015).

The pragmatists in private and public sectors adopt foresight tools and plausible scenarios into the policy design process. The main goal is to find a solution (policies) to the problem (issues). The system thinking process is frequently implemented, entailing "diagnose, discover, define, develop, and deliver." An expert team with insight knowledge to the issues (Delphi) are brought together to work on horizon scanning, vote on the driving forces (STEEP), and create plausible domains (scenarios). The process usually relies on quantitative and computerized data to increase forecast accuracy, channeled through the roadmap report to short, medium, and long-term solutions. This practical strategic foresight approach is used to explore multiple plausible futures to provide scenarios and contexts for decision-making. It is prevalent in policy-related organizations, such as

- IPPD (Institute of Public Policy and Development)[1]: A Brief Summary of "Utilizing Futures Studies in the Transforming World", Thailand 2035: Horizon Scanning Overview
- TFF (Thailand Future Foundation)[2]: Post-COVID Impact on the Futures of Aging Society, Resilient SME: COVID-19 Survival Guide, Multi-Stage Life: Achievable Life Balance
- NIDA (National Institute of Development Administration)[3]: Unavoidable Future of Tech Singularity, Micro Credentail: Educational Trend in the Volatile World

[1] https://ippd.or.th/en/#

[2] https://www.thailandfuture.org/articles

[3] https://futurist.nida.ac.th/

Foresight researchers have implicit philosophies or epistemologies underlying their assumptions about the reality of the world. These assumptions have the power to open or close our visions and guide our research accordingly. Therefore, being aware of these subconscious compasses empowers us to take control and choose suitable theories for our studies.

Positivism/Empiricism assumes that knowledge is achieved from measurable or observable evidences. Therefore, the future can be predicted from the historical record from the past to then present by formula or regression analysis. This form of forescast is widely used in science, economic and financial sector.

Interpretivism perceives knowledge through multiple lenses of historical, cultural, or societal contexts. There is not a singular consensus of ultimate reality, but rather individual or collective interpretation of the events. This enables us to investigate the dominating knowledge of the present and open some room for the other ways of knowing which can lead to alternative futures.

Pragmatism focuses on producing new knowledge based on the available tools. The goal is not to find the "right" answer, but to fulfil the preassigned objectives with an outcome of actionable practice. The summary of epistemological impact can be found in Table 1.

**Table 1:** Epistemologies, Implications and Concerns

| | Positivism/Empiricism | Interpretivism/ (Critical) Constructivism | Pragmatism |
|---|---|---|---|
| **Ontology (reality of future)** | There is a single reality or truth. | There is no single reality or truth. Reality is socially, culturally, historically, and contextually constructed. | Debated, negotiated, reinterpreted reality, in accordance with its function in different situations. |
| **Epistemology (How do we know about the future?)** | Evidence, formulation, theory, prediction, forecast, causation | Interpretation of meaning (discourse, language, signs)<br>Multiple realities —> judgmental relativism | Knowledge is based on experience. Research through design.<br>Action taken from existing available knowledge. |
| **Methodology Orientation** | Trend analysis, regression models, formulas, extrapolation | Accounting of and comparing multiple views and alternative interpretation. | Mixture of different methods. Design-based research. Action research. Consequences from useful practice. |
| **Projection** | Deterministic futures | Alternative futures, make futures problematic | Practical (Actionable) futures |
| **Privilege/ Advatage** | Bureaucrats<br>Intellectuals<br>Capitalists | Cosmology, local knowledge. Dominated cultures. Past traditions, values, language structure | Actionable futures<br>Preconceived understanding of the problems |
| **Dominant Power** | Power potentially steering research direction | Distributed power<br>Deconstruction of power | No inquiry into power |

**Table 1:** Epistemologies, Implications and Concerns (Cont.)

| | Positivism/Empiricism | Interpretivism/ (Critical) Constructivism | Pragmatism |
|---|---|---|---|
| **Concerns** | Post-truth era. Politics of information. Divergence between the reality and the information used to justify the decision because of political pressure from interest group. The motivation of foresight is not for justice, but rather an assertion to decision making or policy decision. | The futures discourse states that there is a good society emerging from the struggles between good over evil, introversion over extraversion, empathy over objectivity. Self reflection or enlightenment can be found between consciousness and the objects it represents. | Responsible for only tasks at hand Negligent of the expectation emotions (hope and fear) of the public. Inclusivity, Equality, Sustainability |

## Oversight

Some practical knowledge and reflection from participatory research from the past foresight workshops with academic and governmental institutions are noted as follows:

## Setting Objectives and Assigning a Foresight Team

There are cases when organization leaders are confused between focusing on their organization's future or their working system's future. An early decision on the pathway and staying on track will produce the ultimate result.

Analyzing the organization's future helps the team foresee the key drivers and relationships and the role the organization will have in each scenario. On the other hand, analyzing the system's future helps the team identify how the most plausible scenarios could affect its existence and role. Both analyses shall be done separately in order to produce an unbiased result. Setting aside a foresight team that can facilitate

the activity and steers and implements its actionable steps is advisable. Some additional guidelines and instructions shall be provided for the designated internal foresight team for the subsequent foresight workshops performed within the organization.

## Applying Cynefin Framework on Policy Design

Cynefin is a complexity thinking framework, developed by David Snowden to assist decision-making.[4] It is based on shifting the understanding of the world from composed of simple machines to composed of complex systems. In the dynamic and interconnected environment, organization leaders must understand the nature of the problems and distinguish among simple, complicated, complex, and chaotic contexts. Simple context has clear cause and effect. The solution can be found from best practices in the past. Complicated context requires expert knowledge to unlock the problem and identify the best solutions from multiple right answers. Complex context does not reveal the right answers, as the future trend is not predictable. Despite being in the dark, chaos context demands an immediate response during the crisis, full of an unknown future (Snowden & Boone, 2007). Recognizing these contexts will enable public officials to identify the situation and align a suitable policy design.

## Cognitive Biases

In preparation for extreme futures or wild card scenarios, it is important to motivate the group to think out of the box and move beyond one's realm of comfort. As human beings, we each have a different degree of desirable futures. "*If we focus on preferable futures instead of anticipating plausible and probable futures, we end up serving one interest group or another unequally* (Piirainen & Gonzalez, 2015, p. 10)." Foresight is inherently a normative process. To achieve the group outcome, one must perfect the art of balancing future scenarios that allow for imagination instead of mental blocks. The choice of an analogy with a less blatant or offensive tone could help maintain the collaborative effort. While it makes sense to stretch the group's imagination, imposing personal values on the group thinking could create discomfort among participants and alienate some group members, thus hindering group work efficacy.

[4] https://en.wikipedia.org/wiki/Cynefin_framework

## Emotions and Emotional Intelligence

Group discussion around some controversial policy options could lead to intense feelings among the team. Creating a safe environment where everyone can express themselves freely is the key to fostering dialogue on uncertainty, conflict, and risk.

Participants should be encouraged to engage wholeheartedly and continuously throughout the process by being present and embracing deep listening skills. CLA (Causal Layered Analysis) is a foresight technique that leads participants through deep surgery into their belief system, which might challenge religious, norm, cultural practices (Inayatullah, 2008). Fear, anxiety, or frustration could surface. A protected environment will enable the group to free their mind and explore what lies beneath them. Practicing emotional intelligence by being aware of one's feelings and recognizing others' reactions are crucial to sustaining the group performance (Goleman, 2006).

## Resight

Modern futures studies can be traced back to 1945, right after world war II, when France's "prospective studies" center was founded. The term "prospective" has been adopted as signifying decision-making with the contemplation of long-term consequences. Since then, a great number of western European countries have made significant development on a philosophical basis for future studies. Not only have they attempted to increase awareness and interest in the futures field, but they vitalized the criticism of global models. This work subsequently led to the formation of international groups to promote human development as an individual, a group, and a community in the emerging world. (Masini, 2006)

In Eastern Europe, future studies are considered an essential process required for policy planning. It is not a mere projection of the past, but rather a principle based on statistical and probably analysis, focusing on scientific and technological processes and their consequences towards social progress.

The future studies in the United States and Canada can be divided into three orientations: technology, utilizing the computerized, technological process in research; sociology, including local communities to design their futures; global, working under the big picture of global outlook on world order.

On the global landscape, foresight practice has become highly fashionable and adopted by corporate, national, and civil agendas. (Son, 2015) Corporations' main interests lie in business strategies and innovations. National endorses foresight as a policy device involving large-scale activities focusing on economic, technological, and social issues. Civil aims to nurture the growing civil society on tackling imminent crisis including environmental issues or global economic instability.

Sadar (1993) argued that the third world has been colonized by the western development concept whereby future studies serve as academic and intellectual instruments in the last frontier. Despite the advanced development of critical futures studies, there is still a lack of coherent discipline and diversity. Son (2015) indicated our current stage (from the 1990s to the present) as a neoliberal view and fragmentation of the futures. This remark is an alarming signal to investigate the underlying moral and ethical foundation within the discipline, make explicit our philosophical presupposition, and reflect on the direction of foresight practice and tool selections. (Bell, 2017)

The visions in futures thinking (or desirable futures) have implicit values based on the influence of history, science, literature, philosophy, or policy. If people are unaware of the changing elements or unconscious of its direction, they naively become part of the change and let the reinforcement process involuntarily unroll. Masini (2006) stresses that futurists must re-evaluate these visions by looking for and listening to "seeds of change" among alternative sources. Her vision of future studies marks essential elements of critical thinking and inclusivity, connecting to social responsibility and ethical values for futurists in searching for visions and building projects for action.

## Foresight

An overview of the foresight history in Thailand shows isolated movements in future thinking, ranging from the field of culture, education, and resource management. Not until 2018, under the initiative of Dr. Suvit Maesincee, foresight practitioners formed and took part in shaping the ecological systems in Thailand, along with surging interest in both the private and public sectors. However, most projects are mandated by some organizational objectives to serve their agenda. The practices are limited within the duty of each institution, but fail to acknowledge the white elephant in the room. Under the political upheaval and resurgence of country-wide protest, how future-ready is

Thailand to handle the different generations' dividing political views? Does Thailand provide its citizen with equality and justice to access their desirable future?

Since the establishment of APEC's first foresight center in Thailand, most practices, tools, and implementations have revolved around strategic foresight. The most common purposes are strategic solutions and actionable plans for the uncertainty of this ever-fast-changing world. Foresight has been in high demand because government organizations face multiple pressures and challenging disruptions. However, building greater anticipatory capacities for policy design is simply reacting to the possible futures instead of proactively creating one's own.

The increasing demand of futures studies in both private and public organizations attracts more people into field. While practitioners have access to a wide varieties of online foresight tools such as United Nation, they tend to choose the tools based in the practical application of the issues they are working on. This creates some risk of limiting the focus to empirical evidences, while ignoring the underlying causes of mechanism of the issues. This can be seen from a case study of air pollution problem in Thailand. The government policy and solutions are limited to the relationship of the seasonal concentration of PM2.5 and the agricultural biomass burning in some regions of Thailand. However, other causes contributing to haze are the year-round industrial, vehicle emissions and most importantly, the outdated emission standard which doesn't hold the polluters accountable to the haze problems (Boonmavichit and Boosabong, 2022). Acknowledging that there is more to reality than meets the eye is a crucial step enabling the practitioners to investigate the root causes of the problems.

Alternative foresight approaches and tools should be promoted among government organizations involved with long-term national strategic plans. It is also important to set up a group with diversity in age, occupation, expertise, and experience and extend to include non-stakeholders, as they might be able to give different perspectives that could otherwise be overlooked.

Structural changes take time. Student protests might one day be considered the revolutionary narratives for the new generation to look back on. Notwithstanding contemptuous expression, the echoing villification on Bangkok's street exhibited an unprecedented public statement about the failure in governance, defying the longstanding law, and marking a dot in the history that opens up new possibilities and unknown risks.

Societal polarization can be attributed to social media influence and the divergent narratives among multiple generations over the years. The longer this persists, the more civil conflict Thai people will have. Thailand needs a safe space to allow constructive dialogues and communication among all parties. It is time to adopt and utilize alternative foresight approaches to reunite the people.

An increasing number of academic articles support narrative approaches as a great potential for futures thinking and strategy development (Milojević, & Inayatullah, 2020). Singapore's Foresight Conference in 2019 highlighted multiple narratives by embracing disagreement instead of focusing on winning (*Foresight Conference 2019 Report: Society 4.0*, 2020). Narrative foresight was proposed as an alternative tool that takes into account multiple contexts which shape the interpretations of individual and collective knowledge. "Narrative Foresight seeks to investigate current modes of knowing the world, challenge detrimental and non-functioning schemes, and open up alternatives. The alternatives use the future to change the present" (Milojević, & Inayatullah, 2020, p. 20).

A constructivist believes that the future is to be guessed, envisioned, built collectively and inclusively (Godet, 2020). How Thailand will navigate through the political division is yet to be determined. The question comes down to whether foresight tools shall be put in place to serve a greater purpose in building a new collective future or merely constricted to provide a solution for strategic plans like previously done in Thailand.

## Conclusion

This paper highlights the development of foresight practices in Thailand and the underpinning philosophies. Most foresight materials and practice focus on providing tools for policy-making and innovation but leave out the consideration of its fundamental epistemology. While the current stage studies and practices are largely based on the western style of futures studies, it is advisable for practitioners to apply a critical lens in understanding its evolution, both in domestic and global settings, to re-evaluate, reflect, and re-conceptualize the philosophy behind their practices. Amid the ongoing public health, economic and political instability, Thailand futurists must be conscious of the social responsibility and the ethical values in creating the visions (desirable futures),

not to reinforce the inherited paradigm, but to investigate how the existing and widely accepted paradigm might be suppressing other ways of knowings, so futures can remain open for possibilities that would lead to the prosperity of all citizen.

## Appendix

A wide range of toolkits is available online for free download. The chosen four are included to cover both private and public foresight practices in Thailand and around the world.

### The Futures Toolkit by the Government Office for Science, UK

Designed for the newcomers by providing some introduction to futures thinking and some design questions for the policy-making process, this toolkit is a useful overview and resource to ensure sound decisions making for government policy.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/674209/futures-toolkit-edition-1.pdf

### Strategic Foresight Toolkit by the School of International Foresight (SOIF)

This comprehensive manual, toolkit, and guidance provide a step-by-step preparation of the foresight process. Among a wide range of tools for public and private sectors, SOIF selected 12 techniques and adapted them for Save the Children organization.
https://resourcecentre.savethechildren.net/pdf/strategic_foresight_toolkit_online.pdf/

### Futures Thinking in Asia and the Pacific by Asian Development Bank (ADB)

This handbook captures the lesson drawn from the foresight pilot project by ADB in collaboration with its regional partners, such as Srilanka, Cambodia, and the Philippines. Aiming to provide transformative change among government officials, ADB attempts to unleash them from just knowledge and evidence but also incorporates emotions and creativity in futures thinking. The most interesting aspect is the application of foresight to support innovation in development work. This comprehensive manual, toolkit, and guidance provide a step-by-step preparation of the foresight process. Among a wide range of tools for public and private sectors, SOIF selected 12 techniques and adapted them for

Save the Children organization.
https://www.adb.org/sites/default/files/publication/579491/futures-thinking-asia-pacific-policy-makers.pdf

## Foresight Tools by Innovation Foresight Institute (IFI) and National Innovation Agency (NIA)

Published in Thai, the foresight handbook provides an introduction to future thinking for strategic planning at the enterprise or national level. The comprehesive content allows reader to understand futures thinking, from its definition, multiple designs and analyses, the nine tools and their the applcation. It's one of the early free reference foresight books for Thai readers.
https://nia.bookcaze.com/viewer/1500/1/เครื่องมือการมองอนาคต

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# Linking Situation Analysis and Research Network Analysis into Roadmap Development: A Case Study of NLP (Natural Language Processing)

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## Abstract

Strategies for developing countries or organizations can be formulated by several means. A well-accepted process is the creation of development guiding maps; also known as the "Roadmap." The formulation of a roadmap starts from the analysis of factors that affect changes and the analysis of future needs. The results will help setting the desired strategic goals and details of development plans, which will be carried out in both investment and necessary activities to achieve the specified goals. This requires analyzing the present and forecasting the future through the processes of Forecasting and Foresight, along with an analysis of the national network readiness of researchers through bibliometric analysis. This article will present a roadmap for research and development of Natural Language Processing (NLP) technology for Thailand's digital industry, which is part of a project supported by Thailand Science Research and Innovation (TSRI) to use as a framework for promoting and supporting the researches in the future.

**Keywords**: Roadmapping, Bibliometric Analysis, Technology Foresight, Technology Forecasting, Digital Industry, Natural Language Processing (NLP)

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# การวิเคราะห์สถานภาพปัจจุบันและความพร้อมของเครือข่ายนักวิจัยของประเทศสู่การจัดทำแผนที่นำทางการวิจัยและพัฒนาเทคโนโลยีสำหรับการประมวลผลภาษาธรรมชาติ (Natural Language Processing: NLP)

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## บทคัดย่อ

การกำหนดกลยุทธ์สำหรับการพัฒนาประเทศหรือองค์กรต่าง ๆ สามารถดำเนินการได้หลากหลายวิธี แต่หนึ่งในกระบวนการที่ได้รับการยอมรับมากที่สุด คือ การสร้างแผนที่นำทางการพัฒนา หรือที่เรียกกันว่า โรดแมพ (Roadmap) ซึ่งกระบวนการจัดทำแผนที่นำทางฯ เริ่มจากการวิเคราะห์ปัจจัยต่าง ๆ ที่ส่งผลต่อการเปลี่ยนแปลงและความต้องการในอนาคต เพื่อนำไปกำหนดเป้าหมายทางกลยุทธ์ที่ต้องการ และรายละเอียดของแผนในการพัฒนาที่จะต้องดำเนินการทั้งในการลงทุนและกิจกรรมต่าง ๆ ที่จำเป็น เพื่อให้บรรลุถึงเป้าหมายตามที่กำหนด ซึ่งในการสร้างแผนที่นำทางฯ นี้จำเป็นต้องวิเคราะห์ปัจจุบันและคาดการณ์อนาคตผ่านกระบวนการของ การพยากรณ์ (Forecasting) และ การคาดการณ์อนาคต (Foresight) พร้อมทั้งการวิเคราะห์ความพร้อมของเครือข่ายนักวิจัยของประเทศ ผ่านกระบวนการบรรณมิติ (Bibliometric Analysis) โดยบทความนี้จะเป็นการจัดทำแผนที่นำทางการวิจัยและพัฒนาเทคโนโลยีการประมวลผลภาษาธรรมชาติ (Natural Language Processing หรือ NLP) สำหรับอุตสาหกรรมดิจิทัลของประเทศไทย ซึ่งเป็นส่วนหนึ่งของโครงการที่ได้รับการสนับสนุนจาก สำนักงานคณะกรรมการส่งเสริมวิทยาศาสตร์ วิจัยและนวัตกรรม (สกสว.) เพื่อใช้เป็นกรอบแนวทางในการสนับสนุน ส่งเสริมงานวิจัยของประเทศในอนาคต

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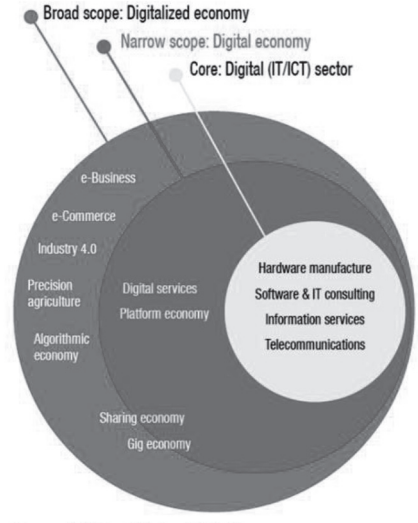
## Introduction

The current situation of Thai economy is in a state of the Middle Income Trap and other related socio-economic problems such as income inequality, corruption, and aging society. In order to reduce the impact of these problems, digital technology is a mandatory supporting technology as an "enabling technology" that is important to drive other elements to make progress faster. Therefore, it is one of the necessities of the national development plan (Office of the National Digital Economy and Society Commission, 2019). In 1995, Don Tapscott introduced the concept of Digital Economy, in the book "The Digital Economy: Promise and Peril in the Age of Networked Intelligence", that digital technology is become increasingly important to economic and social development. Due to industrial development in digital economy, the economy and society in the context of Thailand will undergo rapid changes. In the digital economy system, there are 3 levels of industries: 1) The core of the industry is the development of hardware, software, information services and communication infrastructure; 2) digital infrastructure platforms and services; and 3) economy driven by the use of digital technology. As shown in Figure 1.




*Source:* Bukht and Heeks, 2017: 13.

**Figure 1:** Digital Economy Structure

The elements of Figure 1 can be described as follows.

1) Industry core: In Thailand, the core of digital economy comprises of large or multinational corporations such as Western Digital, SEAGATE, DELTA Electronics, HANA Electronics, Cal-Comp Electronics (hardware) Microsoft, SAP, ORACLE, GOOGLE, FACEBOOK (software and data services) and AIS, TRUE, DTAC, JASMINE (in the communication infrastructure section).

2) Digital infrastructure platforms and services: Some of the key players in digital infrastructure platforms and services may consist of (but not limited to): 1) System Integrator Group, which includes multinational companies such as IBM, Accenture and local companies such as AIT and many small and medium-sized companies; 2) Data Center Service Providers Group and Cloud Service such as multinational companies like Amazon, Microsoft, GOOGLE and domestic companies such as ITEL, Symphony, etc.

3) Economy driven by the use of digital technology: The operators in this group are e-Commerce operators (e.g. Lazada, Shopee, JD Central), Sharing Economy operators (e.g. Grab, Line, and Seekster).

From the structure in Thai's digital economy, it can be seen that most organizations in the country do not focus on fundamental level researches of technology. Rather, it focuses on applied researches that use technologies to solve problems (maybe with some modifications). For instance, in the group of hardware is mostly a bundle of vendors and system integrators. While in the group of software, most software developers work on developing end-user applications rather than fundamental core of the software (such as operating system or program libraries, etc.). Therefore, the scope of this research focuses on the context of specific needs arising in Thailand that can increase the competitive advantage for the country. In this article, the technology will be focused on Natural Language Processing (NLP) because Thai is a unique language and has a group of Thai users mainly in Thailand. Although multinational companies have already developed some technology in this area. But Thai researchers will have a better understanding on "Sentiment Analysis" and "Semantic Search" as primary users of Thai language. If the development of NLP for Thai language is invested by a particular company, the cost of development be far beyond the level that the company can afford. But if it is a sharable platform that companies can use together exist, the company can focus on other areas

of competition instead. This will make the industry and operators as a whole gain higher benefits.

## Literature Review

International research publications in the field of Natural Language Processing (NLP) takes place in a variety of industries for different purposes, e.g. the study of natural language processing and its application to the use of mobile computing and healthcare. Ian James Bruce Young et al. (2019) did a systematic literature review and narrative synthesis on natural language processing research on incident reporting and adverse events in healthcare, extracted from 428 studies published from 2004-2018. The article showed the upwards trend of researches in this field.

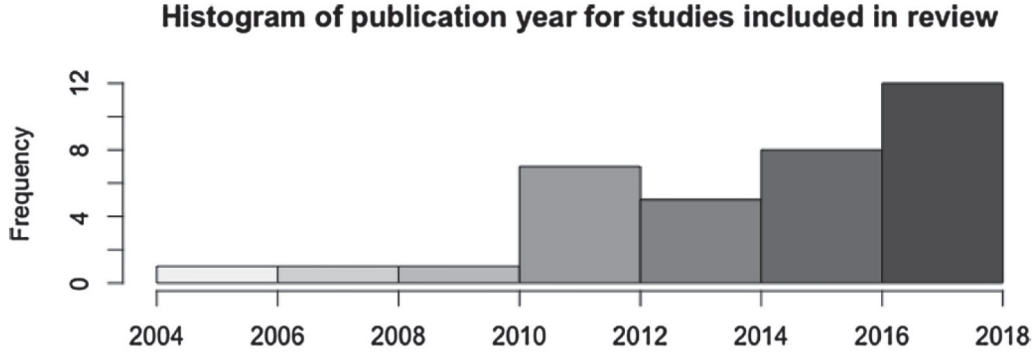



**Figure 2:** Numbers of NLP Publication in Incident Reporting and Adverse Events in Healthcare
*Source*: Ian James Bruce Young, *et al.* (2019)

Meanwhile, Olaronke G. Iroju and Janet O. Olaleke (2015) also conducted a systematic literature review on natural language processing on adverse events in healthcare research. They reported researches in the fields that applies to applications, approaches, systems, challenges, and NLP resources utilization. Its applications include information extraction, information retrieval, questioning and answering, user interfaces, document classification, machine translation, and text summarization. The methods include symbolic/logical approaches, statistical approaches, connectionist approaches, and hybrid approaches.

Using bibliometric analysis on 471 studies related to natural language processing and its applications in mobile computing published between 2000 and 2016 in the Web of Science database, Xieling Chen *et al.* (2018) explored the number of research and citations in this filed. The results indicated the trend of publications in this area of study (Figure 3) and show that collaborative research at the international level is on the rise (Figure 4). Top three countries producing the most researches in this field are the United States, Canada, and the UK, respectively. The first 3 most common keywords are Mobile, Information, and System.

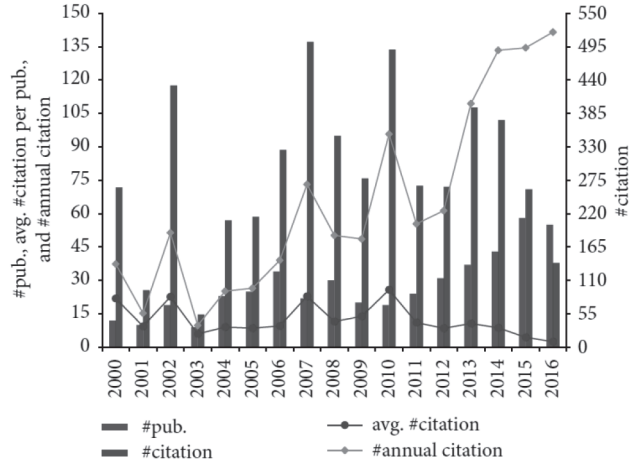



**Figure 3:** Numbers of Researches in NLP in Mobile Computing
*Source*: Xieling Chen, *et al.* (2018)

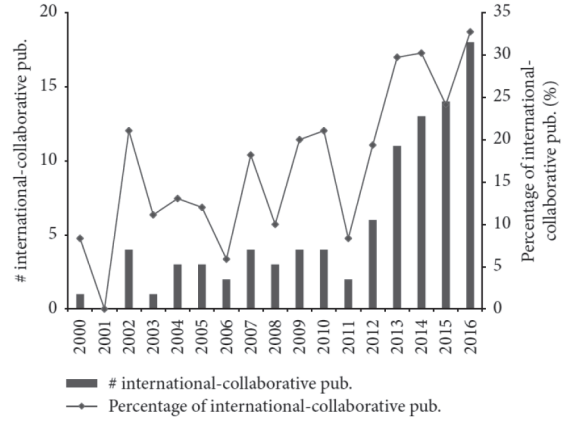



**Figure 4:** International Publications in NLP in Mobile Computing
*Source*: Xieling Chen, *et al.* (2018)

## Current Situation of NLP for Thai Language

Thailand's National Electronics and Computer Technology Center (NECTEC) has promoted the use of artificial intelligence technology in various fields through research groups within the agency (Figure: 5). For example, a platform called "AI for Thai" project is focusing on research and development of artificial intelligence and machine learning technologies, especially the development of language processing systems. Nature (Natural Language Processing) is a collection of instructions (Application Programming Interface: API) that operators or program developers can utilize and apply for their works.

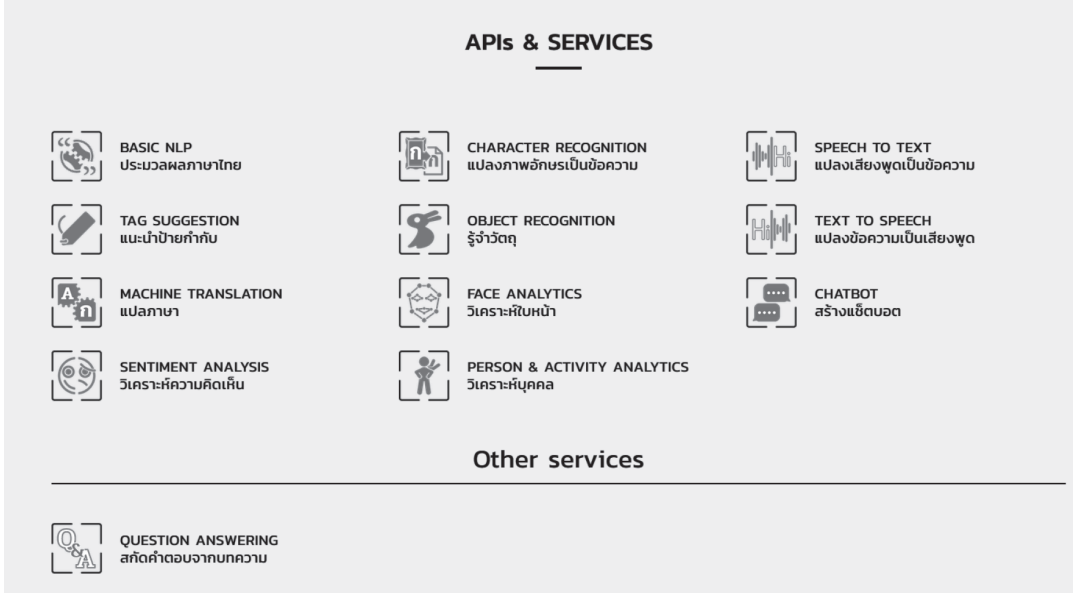



**Figure 5:** AI for Thai: Thai AI Service Platform
*Source*: https://aiforthai.in.th

The researches and publications regarding NLP in Thailand have some significant growth in areas such as chatbots, automated answering systems, sentiment analysis, semantic search, sentence interpretations, social listening, and machine learning techniques. Furthermore, many researchers and developers are undertaking some specific characteristics of Thai language such as name identification, word division, sentence division, keyword search, and interpretation. The NLP technology adoption in Thailand is growing in rapid rate. However, accuracy, processing speed, and machine learning to improve the NLP technology are still in early stage.

## Bibliometric Analysis of Thai Researchers' Network

An exploratory study is required to understand the current situation of NLP in Thailand in order to use this information for later process in Roadmap development. To do so, the researchers conducted a bibliographic analysis on NLP in Thailand by analyzing 510 articles from 234 academic journals and conferences covering articles from 1993 to 2020. These data are collected from SCOPUS database searched on April 2020. It indicated the growth of publications in this area. Especially during the year 2017-2019, it has grown exponentially. (Information of the year 2020 represents the beginning of 2020, so the numbers shown in the graph do not reflect the numbers for the full year. 2020) as shown in Figure 6.

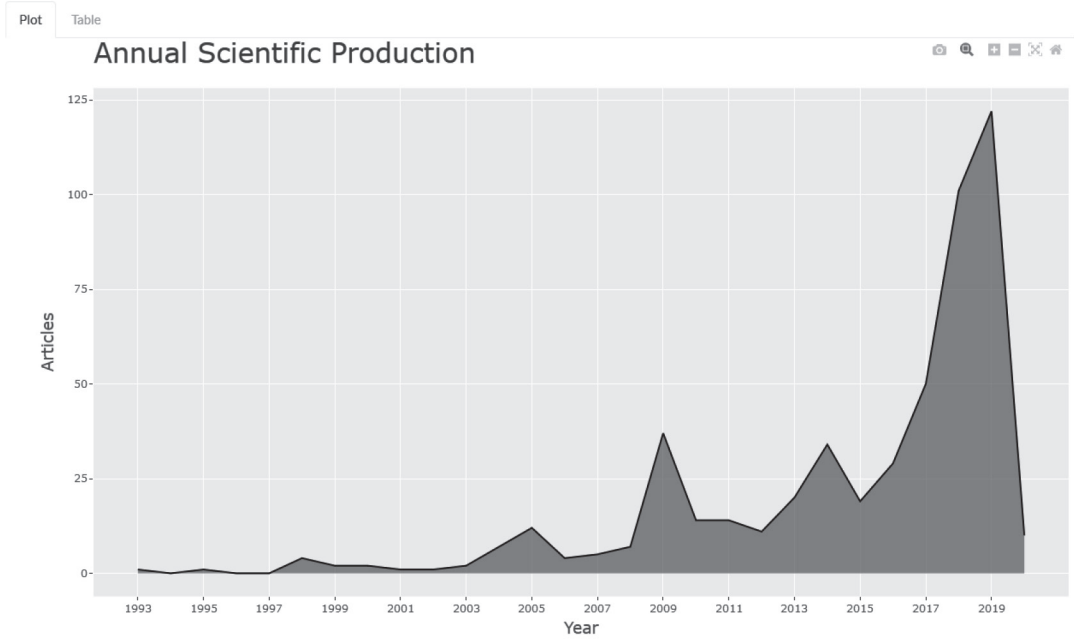



**Figure 6:** Numbers of NLP Publications from 1993 to 2020

*Relevant Authors and Affiliations*

The data used in this study represent only researchers in Thailand, and the bibliometric analysis found the most relevant authors in this field were: Supnithi, T. (31 Documents), Theeramunkong, T. (23 Documents), Ketcham, M. (19 Documents), Haruechaiyasak, C. (14 Documents), Chumuang, N. (13 Documents) and Sornlertlamvanich, V. (13 Documents) respectively as shown in Figure 7.

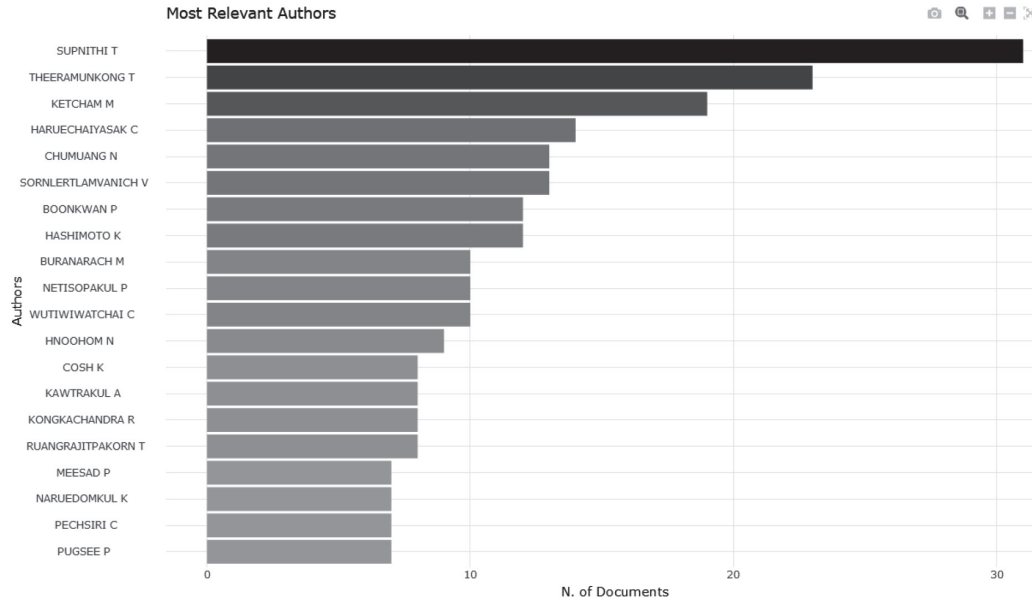



**Figure 7:** Numbers of the Most Relevant Authors

With further analysis, the researchers divided contributions of these authors into 3 periods. First, during 1998-2007, it is the early stage of NLP that the major contributors in were Naruedomkul, K., Sornlertlamvanich, V., and Kawtrakul, A. Second, during 2008-2014, the major contributors were Supnithi, T., Wutiwiwatchai, C., Haruechaiyasak, C., Theeramunkong, T., and Pechsiri, C.. Third, during 2015-2020, the numbers of authors who interested in the in the field increased significantly with some notable authors such as Supnithi, T., Wutiwiwatchai, C., Haruechaiyasak, C., Theeramunkong, T., and Netisopakul, P.. as shown in Figure 8.

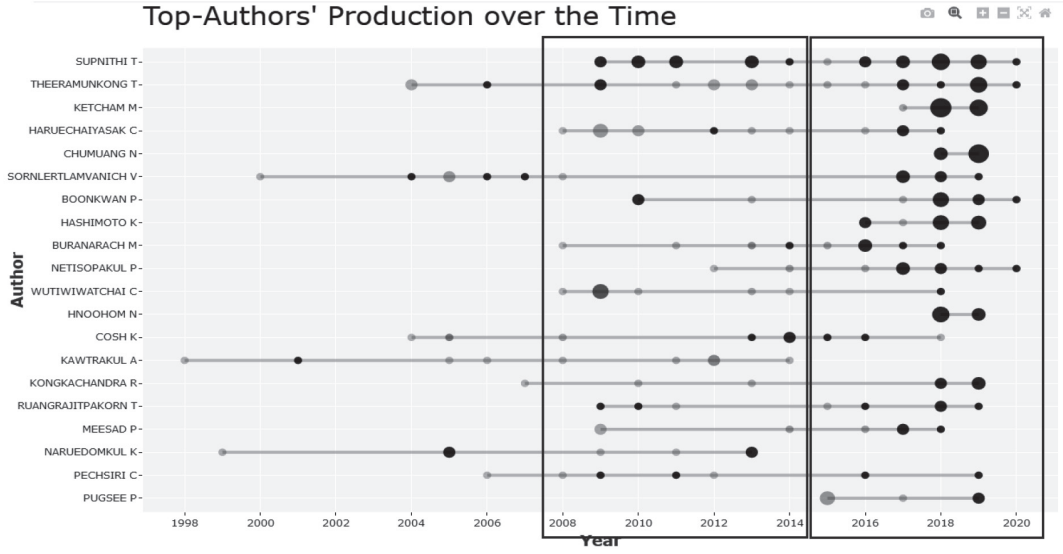



**Figure 8:** Authors' Production over the Time

In Figure 9, it shows the relations among authors, affiliations, and keywords. National Electronics and Computer Technology Center (NECTEC) appeared twice due to the different input when authors submit to publications. However, it can be seen that NECTEC, Thammasart University and Chulalongkorn University were the major affiliations in NLP. The major two keywords focused by the authors were "Natural Language Processing" and "Sentiment Analysis."

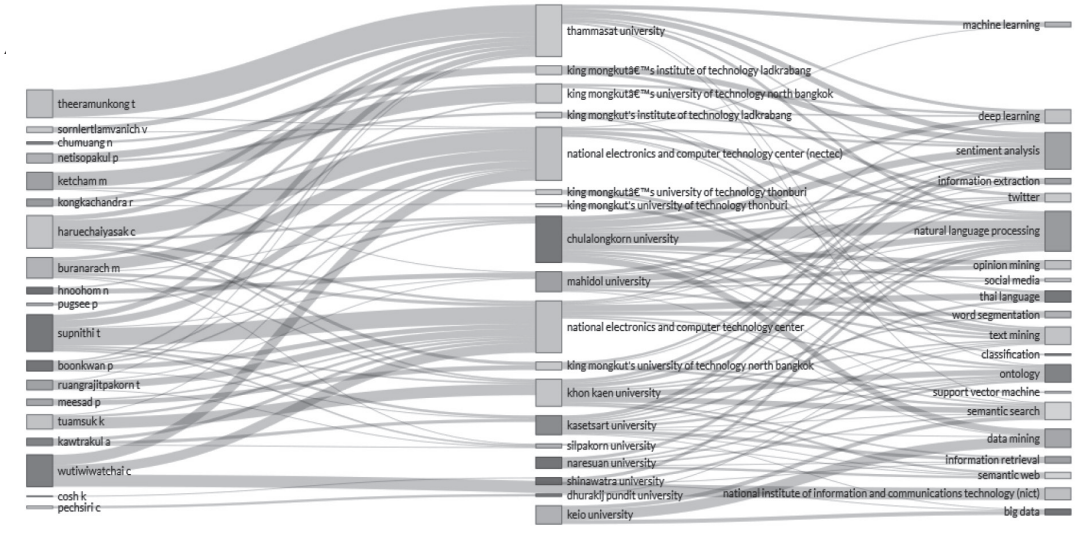



**Figure 9:** Relations among Authors-Affiliations-Keywords

*Authors' Collaborations*

Additionally, the results from bibliometric analysis identified the collaborations among authors with four notable groups shown in Figure 10. First, the group that was leaded by Wutiwiwatchai, C. had 13 authors in collaborations. Second is the group that leaded by Supnithi, T. 10 contributors. Followed by the groups of Sornlertlamvanich, V. with 4 authors and of Haruechaiyasak, C with 3 authors.

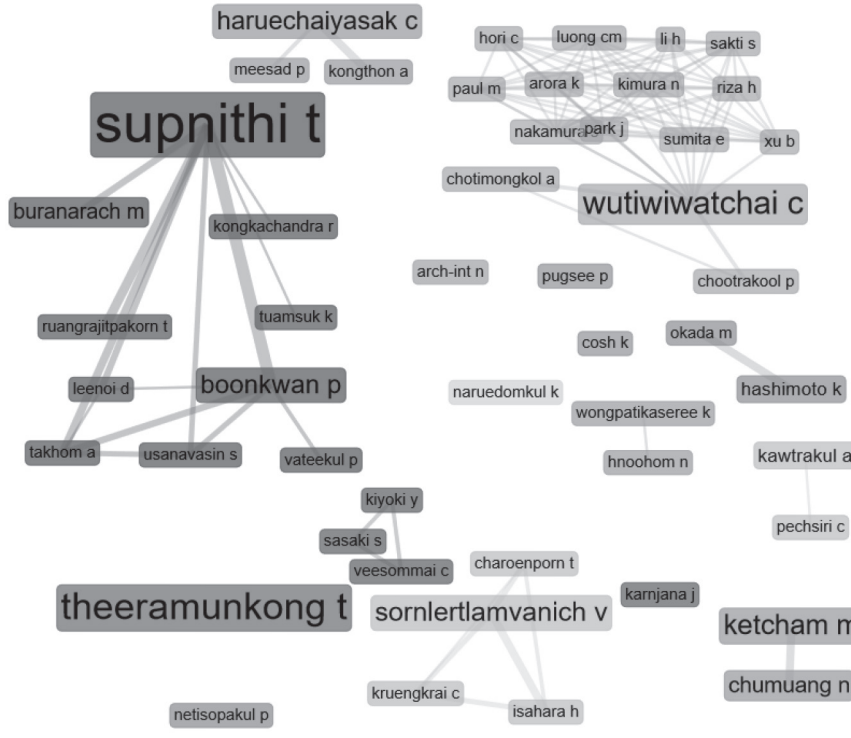



**Figure 10:** Collaborations among Authors

By analyzing the keywords that are used in order to see the connection between the key words, the study found 4 major topics in publications as shown in Figure 11.

The first group (red) contains the terms directly involved with natural language processing systems such as computational linguistics, feature extraction, named entities, Thai language, and word segmentation, etc. Research in this group contains keywords that cover all the fundamental processes of NLP system development. These keywords represent the fundamental of NLP study.

The second group (blue) consists of keywords such as data mining, text mining, learning algorithms, deep learning, sentiment analysis, and classification, etc. This research group represents the important to develop data-based learning techniques for the benefit of applications such as polarization analysis of positive and negative opinions or document classification, etc.

Group 3 (purple) contains word groups such as semantics, knowledge based system, ontology, semantic search, semantic web, artificial intelligence and search engines, among others. Research in this group focuses on the meaning of words, phrases or sentences to make tasks such as information retrieval more efficient and accurate.

The last group (green), with the least number of words, it consists of the words human, animal, diagnosis, article, etc. The articles in this group are probably researches related to the application of the NLP system.

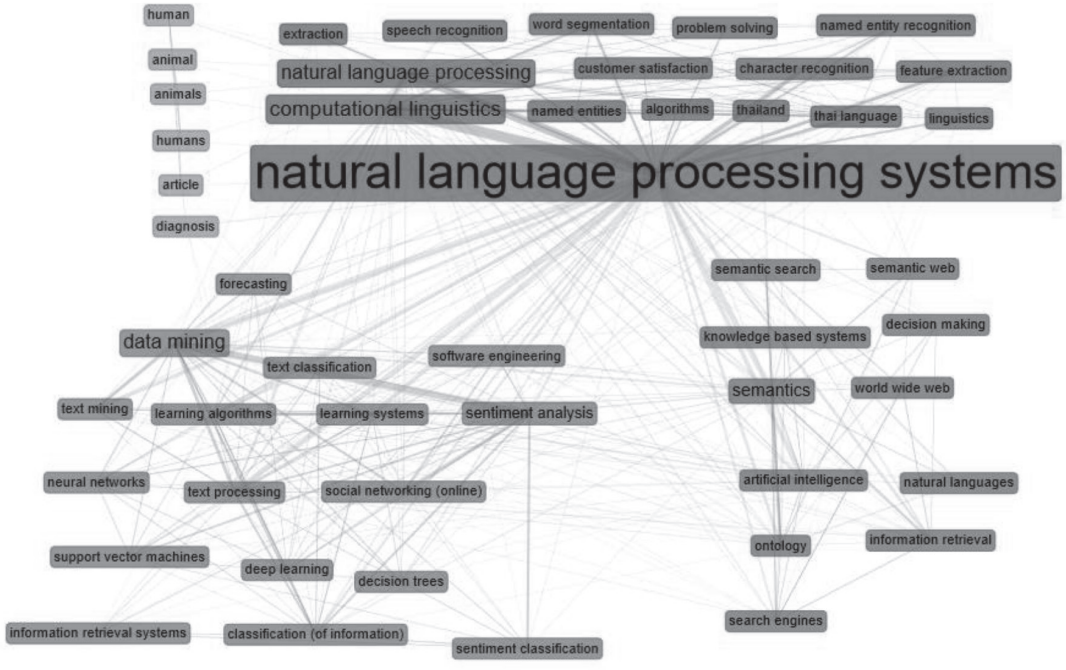



**Figure 11:** Analysis of Issues in Natural Language Processing Conducted by Researchers in Thailand
*Source*: Researchers

From the analysis of research cooperation between agencies, this study found that the most outstanding cooperation was the cooperation between NECTEC and Thammasat University followed by the cooperation among NECTEC, King Mongkut's University of Technology North Bangkok, and Silpakorn University. There is also an international cooperation between Mahidol University and York University as shown in Figure 12.

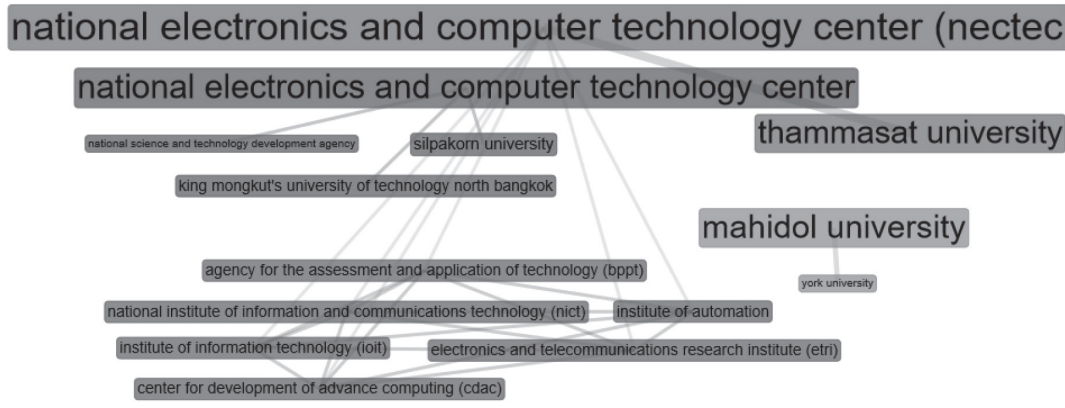



**Figure 12:** Network of NLP Research Institutes in Thailand

## Technology Roadmapping: Analysis and Process

Technology roadmapping is a well-accepted process for planning and allocating resources for science technology and innovation development. It presents the elements and structures that are related for each period. To develop a technology roadmap, it requires a strategic assessment process, and the technology is selected to achieve the desired objectives. The roadmap then will be summarized and communicated to operate in accordance with the core business, which will lead to a connection between research project development products or services and the needs of the target audience (Gerdsri, 2018).

A roadmap is not only just a simple planning, but it is also the representation of organization's vision or executives' vision about the future development of the organization and operational guidelines, which is strategically conducted through a systematic analysis process to integrate business administration and technology management (Gerdsri et al., 2019; Gerdsri and Manotungvorapun, 2022).

## Technology Roadmapping for NLP Research and Development

After bibliometric analysis, the research team organized 3 focus group workshops to guide the development of NLP technology mapping during August-December 2020 by inviting relevant parties from the industries, higher education institutions, research institutes and researchers who play roles in NLP research. In this process, the research team acquired opinion and data regarding many factors such as business drivers, strategic targets, development goals, research and development programs, infrastructure, and resources. In addition, forecasting and foresight process was conducted by asking predictive questions such as the growing trend of NLP technology and patterns of use of NLP technology in various industries and by asking questions about the future, such as the goals of Thailand and strategies to increase competitiveness. (The elaboration of this process can be found in the full paper submitted to Thailand Science Research and Innovation (TSRI)). The result is shown in Figure 13.

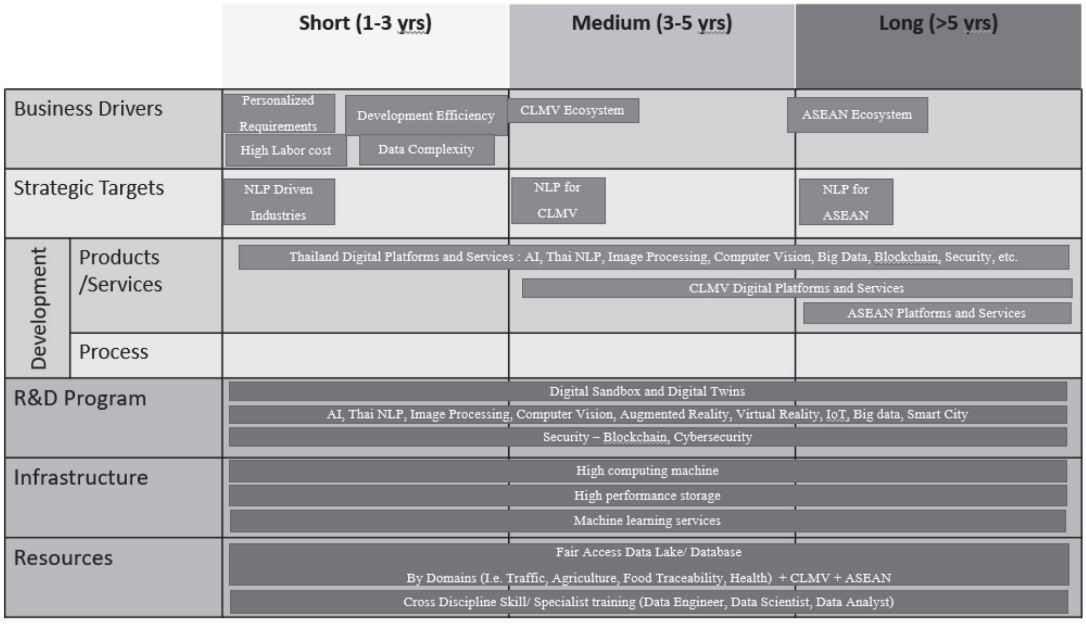



**Figure 13:** Technology Roadmap for NLP in Thailand

From figure 13, it indicated the short-term driving factors that included personalized requirements, high labor cost, data complexity, and development efficiency. NLP itself is considered to be an enabling technology that can help create growth in other industries. To achieve that purpose, supports in research and development are necessary in many area such as digital sandbox, digital twins, and security systems. Also, investments in infrastructure such as data center and machine learning are important. Nonetheless, fair-access data lake or database is a crucial resource for organizations to build their products or services in artificial intelligent (include NLP) and digital economy. For the medium and long term, the plan can extend the NLP technology development to become an ASEAN Platform that can support CLMV languages such as Laos, Myanmar, Cambodia and Vietnam in the future.

## Conclusion

The supporting on the research and development of Natural Language Processing (NLP) technologies in the digital industry field through government programs may not be to promote any specific entrepreneurs, small firms, or large corporates. Rather, the supports should go to the fundamentals of research and technology development as a base for entrepreneurs to be able to continue to do business in the future. Therefore, the return on investment should not be measured from short-term financial results. But it should rather be measured by how entrepreneurs use the outcomes of these supports on their business platforms. For the future growth plan of NLP technology as shown in Figure 9, the development may consider the languages that are very close to Thai such as Lao (which has a population of about 7.2 million people), Thai Lue (which is the indigenous language in the region between Thailand, China, Myanmar, Laos and Vietnam, totaling about 2 million people), or the language of countries in CLMV such as Vietnam (97 million people), Myanmar (54 million people), and Cambodia (16 million people). These languages are not the development targets for investment of large companies like Google or Microsoft. But Thailand may have a competitive advantages when compared to the capabilities of these countries.

In order to create fair-access data lakes or databases, strong supports from top management and policy makers are critical to drive this plan and to change the attitudes of various agencies who own data. Nonetheless, guidelines for data usages and protections have to catch up with the changes and growth of the database utilizations as well.

## Acknowledgement

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Egloff, G. & Fitzpatrick, A. (1997). Vocationally Oriented Language Learning. *Learning Teaching Journal. 30* (July): 226: 242.

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**Examples of Translated Thai References**

Prachason, Sajin. (2009). *The Development of Food Security Indicators*. Sustainable Agriculture Foundation (Thailand).

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