Ministry of Higher Education,
Science, Research and Innovation

Higher Education Plan

for Thailand's Manpower Production and Development

(2021–2027)

Revised Version for 2023–2027

Office of the Permanent Secretary
Ministry of Higher Education,
Science, Research and Innovation

According to the Council of Ministers Resolution
December 13, 2022

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Ministry of Higher Education, Science, Research and Innovation

Strategy and Policy Division

Message from the Minister of Higher Education, Science, Research and Innovation

The Ministry of Higher Education, Science, Research and Innovation (MHESI) is the national authority that creates opportunities, intelligence and the future for Thailand. It is a leading agency with the strength and readiness to enhance the national strength and solve problems for the country. Its mission can be divided into 2 phases. For the short-term or urgent, such as during the COVID-19 pandemic, MHESI has managed to tackle problems such as unemployment, setting up field hospitals to fight COVID-19 and vaccination centers against COVID-19 in higher education institutions. For the mid-term and long-term phases, MHESI has reduced tuition fees to help students and their parents and attracted volunteers and volunteer health workers to treat COVID-19 patients under the “MHESI Helps Survive” project. Moreover, MHESI helps promoting the new “Bio-Circular-Green Economy” or BCG—a new economic model—to accelerate Thailand as an industrialized country 4.0 in its medium and long-term goals. In addition, MHESI has also established higher learning bodies in the fields of social sciences, humanities, and fine arts to manage Thai higher education to be more balanced and comprehensive in all disciplines. Furthermore, MHESI has advocated research on alleviating poverty that aimed directly at targeted poverty. Other long-term initiatives carried out by the Ministry include the abolition of limited time for graduation to support lifelong learning, opening up opportunities for lecturers to be granted academic tenure without submitting research papers or textbooks. MHESI has also set the goal to develop Thailand's space industry to enhance the country's economy and has launched a training course called “WINS” to provide training for senior executives to instill their unity and harmony. It is hoped that this will help creating and developing careers that will benefit the country's advancement. This mission reflects the MHESI's capacity that will serve as a significant instrument in leading Thailand to become a developed country.

Considering the country's five-year development during 2023 - 2027 is an important period for MHESI to accelerate to solve problems and obstacles and take proactive planning to enhance the country's competitiveness. Therefore, the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027, Revised Version for 2023 – 2027 will be a development framework to harness the capacity of higher education institutions and to stimulate multi-sectoral agencies to synergize their forces for Thailand to escape the middle-income trap to become a developed country. At the end of 2027, Thai higher education will need to be changed, and key mechanisms will be reformed to drive the economy through science-based research and innovation. Technology will be the foundation to support future industries, along with economic development that will be based on harnessing a comprehensive body of knowledge and sciences. Moreover, there are needs to transform cultural diversity and biodiversity to create added value for the national economy, such as tourism, arts and cultural heritage. Historical tourism or

the economy of well-being will make Thailand a country with a high-value creative economy in the future.

However, higher education has a very important mission and responsibility in producing quality manpower that will attract investment from within and outside the country, such as science and technology. Thai higher education institutions have to emphasize on providing a curriculum that meets the needs through collaboration among higher education institutions, other level of education institutions, research institutes, and agencies with various specializations in regular and sandbox formats. Furthermore, Thai higher education institutions need to pay more attention to elevating their institutions up to a world-class level or at least equal to higher education institutions in Asia in the shortest time possible by focusing on targets that yield results quickly and focusing mainly on subject ranking results. MHESI should motivate both public and private higher education institutions to augment their academic excellence following their capacity and interest. The progress and development of higher education institutions must be carried out together with providing opportunities for access to higher education. As a consequence, disadvantaged people can become the new elite in higher education, including reducing inequality and alleviating poverty in Thai society. Higher education will leave no one behind.

As the Minister of Higher Education, Science, Research and Innovation, I sincerely hope that all agencies and sectors will join hands to drive higher education to achieve its ambitious goals and produce tangible results for Thai education, Thai people, and Thailand.

Adjunct Professor Dr. Anek Laothamatas

Message from Chairman of the Higher Education Commission

The Higher Education Commission (HEC) has a role in formulating policies and strategies; driving higher education development; as well as monitoring the achievements to be in line with the national strategy, master plan and other plans, including government policies. Since 2021, HEC has pushed the policy on manpower production and development to have sufficient quantity and quality workforce that meets the needs of the S-curve and New S-curve industries, together with unlocking the quality regulations and higher education standards as an important process for improving the quality of people throughout their lives. The Commission has also increased the effectiveness of the management of higher education institutions toward academic excellence and accelerated projects and activities that contribute to their key success factors according to the higher education system reform. The implementation is in line with the development strategy of the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027 which aims to develop human resources, create intelligence, and cultivate morality for the sustainable development of Thai society. Five years after 2021—from 2023 to 2027—HEC will strive to develop higher education in accordance with the revised Higher Education Plan 2023 -2027. It is expected that when the plan is completed, it will significantly improve higher education to suit the current social conditions that have been interrupted by the impediment factors such as the COVID-19 pandemic, the future changing trends, together with the changing administrative context to amalgamate higher education, science, research and innovation under the same ministry.

In essence, the Revised Higher Education Plan 2023 - 2027 lays out a clearer five-year development strategy for 2023 - 2027. There are an additional 10 key driving forces over a three-year implementation period for 2023 - 2025 that focus on the outcomes of higher education development, research, academic services, and preservation of arts and culture to strengthen manpower and the higher education ecosystem with higher potential. This will serve as an enhancing supplementary for developing higher education, science, research and innovation systems. The consequences will be extended to specific effects in 2 dimensions as follows: (1) the enhancement of economic and industrial competitiveness according to the Bio-Circular-Green industries and services of the future; and (2) social dimensions of Thai people's well-being at all stages of life to alleviate social inequalities. It is considered that the success of each dimension will be conducive to the total success of the plan. Therefore, the implementation of the plan is challenging and would not be possible if key players do not collaborate with each other. They include government agencies; research agencies; network partners; national committees; private sectors; public and private higher education institutions; from the individual level of students, professors, researchers, administrators, university councils; and manpower in the country to join forces together.

Therefore, I, as the Chairman of the Higher Education Commission, expect that the combined forces of all collaborators will aim for the common goal in the same direction. Higher education is not just a segment of education, but it is a crucial force driving the country and it will not be too difficult with the goal to lead Thailand to elevate to a developed country by 2027. On this occasion, I would like to express my gratitude to all members of the Commission, the Sub-Committees, Working Groups and officers of the Office of the Permanent Secretary of Higher Education, Science, Research and Innovation, as well as stakeholders in reviewing the Revised Higher Education Plan 2023 - 2027 until its completion at this moment.

Professor Somkit Lertpaithoon

Message from the Permanent Secretary for Higher Education, Science, Research and Innovation

The Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027, Revised Version for 2023 – 2027 consists of key strategies and key drivers that lay the foundation for the direction for public and private higher education institutions to play roles in the country's economic and social development. MHESI is the main agency for the production and development of quality manpower with high competency that creates body of knowledge and excellent innovation. It also served as a center to incorporate experts from various disciplines, both science and social sciences, and from inside and outside the country. This central body serves to respond to the development direction according to government policy, as well as to drive the country to support the BCG economy. It also supports the development of the electric vehicle industry, digital technology, smart electronics, development of the country's logistics and railway systems, future industries such as the aerospace industry, and the use of value-added knowledge from a diversity of historical and cultural heritages to strengthen the pride of Thai people. The mission of higher education also includes the role of higher education in solving problems such as social inequality and disparities, and access to higher education. Moreover, the COVID-19 pandemic has resulted in the need for higher education support to accelerate the up-skilling and re-skilling of in-service labor forces to raise production capacity.

Therefore, the Office of the Permanent Secretary for Higher Education, Science, Research and Innovation will play roles in promoting, supporting, suggesting guidelines. This operation serves as the nerve system of the Ministry to integrate both policy and practice levels with agencies both inside and outside. In this regard, MHESI has created linkages and reduced constraints that will be obstacles in driving higher education towards excellence, and to be able to carry out the assigned tasks effectively in accordance with the country's development direction. MHESI has carried out all its mission by strictly adhering to the principle of academic freedom of all higher education institutions, while bearing in mind the integration with the framework of the National Strategic Plan, Master Plan, National Reform Plan, the National Economic and Social Development Plan, the Science, Research and Innovation Plan, and all the legal framework stipulated by relevant agencies. It is hoped that the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027, Revised Version for 2023 – 2027 will serve as an important instrument to guide the direction and generate roles for higher education institutions to harness their capacities and resources to support the country's development effectively. The ultimate goal of the plan aims for Thailand to escape the middle-income trap to a high-income country and to become a developed country in the near future.

Professor Sirirurg Songsivilai, M.D., Ph.D.

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Preface

The Higher Education Commission (HEC) has a role in formulating policies and strategies; driving higher education development; as well as monitoring the achievements to be in line with the national strategy, master plan and other plans, including government policies. Since 2021, HEC has pushed the policy on manpower production and development to have sufficient quantity and quality workforce that meets the needs of the S-curve and New S-curve industries, together with unlocking the quality regulations and higher education standards as an important process for improving the quality of people throughout their lives. The Commission has also increased the effectiveness of the management of higher education institutions toward academic excellence and accelerated projects and activities that contribute to their key success factors according to the higher education system reform. The implementation is in line with the development strategy of the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027 which aims to develop human resources, create intelligence, and cultivate morality for the sustainable development of Thai society. Five years after 2021—from 2023 to 2027—HEC will strive to develop higher education in accordance with the revised Higher Education Plan 2023 -2027. It is expected that when the plan is completed, it will significantly improve higher education to suit the current social conditions that have been interrupted by the impediment factors such as the COVID-19 pandemic, the future changing trends, together with the changing administrative context to amalgamate higher education, science, research and innovation under the same ministry.

In essence, the Revised Higher Education Plan 2023 - 2027 lays out a clearer five-year development strategy for 2023 - 2027. There are an additional 10 key driving forces over a three-year implementation period for 2023 - 2025 that focus on the outcomes of higher education development, research, academic services, and preservation of arts and culture to strengthen manpower and the higher education ecosystem with higher potential. This will serve as an enhancing supplementary for developing higher education, science, research and innovation systems. The consequences will be extended to specific effects in 2 dimensions as follows: (1) the enhancement of economic and industrial competitiveness according to the Bio-Circular-Green industries and services of the future; and (2) social dimensions of Thai people's well-being at all stages of life to alleviate social inequalities. It is considered that the success of each dimension will be conducive to the total success of the plan. Therefore, the implementation of the plan is challenging and would not be possible if key players do not collaborate with each other. They include government agencies; research agencies; network partners; national committees; private sectors; public and private higher education institutions; from the individual level of students, professors, researchers, administrators, university councils; and manpower in the country to join forces together.

Executive Summary

The Office of the Permanent Secretary for Higher Education, Science, Research and Innovation has reviewed and improved the Higher Education Plan for Thailand's Manpower Production and Development for 2023 - 2027 to be in line with the important social context during the 2023 - 2027 framework, as well as the 13th National Economic and Social Development Plan, the Policy Framework and Strategies for Higher Education, Science, Research and Innovation 2023-2027. The formulation of the Plan has also been carried out in parallel with the Science, Research and Innovation Plan for 2023 - 2027 by appointing a working group to review the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027. The appointed working group was given the task of determining the conceptual framework of the plan to have complete and appropriate contents. Nevertheless, the refinement and the consideration on approval of the Plan are under the review and recommendation made by the Subcommittee on Policy and Plan at the 6/2021 meeting on August 6, 2021 and endorsed by MHESI's Minister on September 10, 2021. The Plan draft was also approved by the National Council on Higher Education, Science, Research and Innovation Policy at its 3/2021 Meeting on September 15, 2021, and the Council of National Economic and Social Development at its 12/2021 Meeting on December 1, 2021.

The principles and elements of the Plan still emphasize the role of higher education as a base for human resources development, along with leaps and bounds and sustainable development of body of knowledge with no one left behind. The approved plan has designated the intention to make Thai higher education to lead development by providing learning opportunities for human resources to develop their capacities both academically and professionally. While Thai people will have opportunities to continue learning throughout their lives. Thai higher education will serve as a source of modern knowledge and sciences, leading to endeavors to solve problems and develop the national economy. Thai higher education strives toward efficient and effective management for the learning and development of sciences and academic subjects including learning to integrate cross-disciplinary sciences that will elevate quality for the enhancement of competitiveness up to the international level. The Plan has been specified with the elements as follows:

Vision

Mission

Strategy for five-years higher education development for 2023 – 2027
consisting of 10 goals, 30 indicators, 3 strategies, 9 guidelines and 30 strategies

Key driving force for 3 years (2023 - 2025)
with 7 flagship policies and 3 flagship mechanisms

Milestones, Outcomes and Impacts of Development

Vision
Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society

Mission

To raise the quality of higher education to be comparable to developed countries and transfer the body of knowledge and innovation widely to be able to enhance competitiveness in an environmentally friendly manner. To increase higher education opportunities to cover the higher education age group population, as well as to advocate the disadvantaged groups, working age-group, and the elderly to have access to quality education. To focus on the importance of the development of skills and competencies in accordance with the needs of the labor market, and to create jobs and entrepreneurship in their own locality or their communities. The higher education's mission will also include upgrading the higher education system in accordance with good governance principles in line with the academic freedom in administering higher education institutions, so as to be able to develop professional management systems based on the diversity of their identities that will benefit the development of the country in various dimensions.

Strategy for higher education development

The Higher Education Development Strategy is a five-year implementation plan focusing on three main aspects, namely: graduates and manpower, research ecosystem, and new higher education. The strategy will cover a variety of activities in the higher education system both its strengths and weaknesses. In terms of strengths, they will generate higher education outputs and national outcomes. In terms of weaknesses, the strategy will be carried out to improve higher education's efficiency by focusing on the 4 missions of higher education institutions taking into account the principles of their rights and academic freedom consisting of 3 strategies as follows:

Strategy 1 Human capacity-building

(responding 4 targets and 11 indicators, driven by 3 approaches, 14 strategies)

Thai higher education gives emphasis on lifelong learning for all according to the SDGs advocated by the United Nations by focusing on human development along with raising awareness of the impact of human activities on natural resources and the ecological footprint. The endeavor is intended to move towards a circular economy as the key to sustainable development by providing unlimited access to lifelong learning for all citizens, under the concept that higher education will not leave anyone behind and aims to alleviate inequality in Thai society. The concept will focus on building a body of knowledge and skills readily for the transformation of the future under the transversal skills framework by enhancing the quality of education and elevating competencies of manpower to meet the direction of the national development in accordance with the Bio-Circular-Green (BCG) Model in both degree and non-degree (reskilling, upskilling, and new skilling) by means of experiential education, integration with work-based learning, as well as elevating quality of personnel of higher education institutions to be more professional.

Strategy 2 Research ecosystem strengthening

(responding 3 goals and 11 indicators, driven by 2 approaches and 9 strategies)

Thai higher education will pay pivotal attention to the emphasis on developing an ecosystem that will be conducive to creating body of knowledge, technology and innovation. The endeavor will be implemented through research units in higher education institutions with quality infrastructure by urging toward basic research such as blue sky research, scientific discovery, and frontier research according to the uniqueness and potential of individual higher education institutions. The initiative is intended to strengthen sustainable research capacity in the higher education system, as well as to push for collaboration to conduct research projects with the public and private sectors domestically and internationally. The policy under this strategy also includes the encouragement to mobilize resources and experts to transfer knowledge and innovation for commercial utilization (Corporate University), to deliver academic services to society (social engagement and enterprise), as well as to develop community enterprises, grass root level

economy (SMEs), technology-based startups, innovation-based economy (IDEs) and deep technology, among others. Other important issues of this strategy include the development of research skills for graduates and researchers at postgraduate and postdoctoral levels, and entrepreneurial thinking, which will be implemented in parallel with the reduction of restrictions and barriers affecting research, allocation of research funds, and the management of intellectual property.

Strategy 3 Higher education transforming

(responding 3 goals and 8 indicators, driven by 4 approaches and 7 strategies)

The transformation of new higher education system must be urgently adjusted and reformed in order to tackle the constraints that hinder the development of higher education. The endeavor will be focused on adjusting the management in higher education institutions to observe the principles of good governance; citizens and stakeholders will have access to transparent information and facts, which will be the basis for increasing the efficiency of institutions' operations. The endeavor will have to be implemented along with ensuring financial stability in the higher education system by assuring that the national budget will be spent worthily, effectively, and with maximum benefit. Budgeting has to focus on responding to demand (demand side financing) and its allocation depends on higher education institutions to submit a project-based proposal that must respond to the goals set up by the Revised Higher Education Plan 2023 – 2027, as well as the country's goals. In addition, higher education institutions also have to focus on the development of digital infrastructure and database systems (Big Data) for the delivery of higher education and research that will enhance the efficiency of teaching and learning management and higher education management. It must fully support a lifelong learning society and challenge Thailand to escape the middle-income trap. Therefore, higher education must be transformed through the development of higher education institutions based on the diversity of identities (Reinventing University) to enhance the national's competitiveness, as well as elevating Thai higher education institutions in the world university ranking to be recognized as an international hub for higher education for Cambodia, Laos, Myanmar, and Vietnam (CLMV), regionally, and internationally.

Key driving forces

Key driving forces for the Higher Education, Science, Research and Innovation Policy and Strategic Framework for 2023 - 2027 **are formulated with 7 flagship policies and 3 flagship mechanisms** depending on the priorities setting to focus on key driving forces to achieve tangible results within 3 years (2023 – 2025). The key driving forces are devised based on their relevance, effectiveness, and efficiency as follows:

Seven Flagship Policies (FP)

FP 1: High-performance and high-potential manpower to meet the needs of industrial development in accordance with the BCG model (agriculture and food; medical and health sciences; tourism and energy including materials and biochemistry; and target industries in accordance with MHESI's Policy and Strategic Framework.

Achievement index: Reducing the gap between education levels, Education Sandbox, Thailand National Credit Bank System, platform supporting credit transfers. Learners can access education thoroughly and fairly. Graduates and manpower in the sciences and social sciences fields will have capacity and potential according to the needs of the labor market. The implementation will attract investment from modern businesses and industries. Reduce unemployment of manpower after the crisis of the COVID-19 pandemic and increase the number of graduates entering the labor market.

FP 2: High-level manpower will have the capacity to support new industries and services of the future.

Achievement index: Lecturers of higher education institutions are qualified and deliver teaching and learning professionally. Research personnel are academically competent; body of knowledge, technology and innovation are utilized in new industrial and service sectors. There are scientists, researchers, innovators and others joining the working force in the Thai academic community with international standards, quality infrastructure of GRI; in addition, there is a platform for cooperation in knowledge transfer and exchange of best practices.

FP 3: Community enterprises, grassroots economic systems, innovation-based economies, as well as SMEs, IDEs, and Deep Tech: Startups are strengthened and they are able to create commercial value business.

Achievement index: Entrepreneurs, technology-based startups that elevate to become spin-off companies in the future, together with existing entrepreneurs who evolved into IDEs, and deep tech: startups in the future. Their competitiveness both domestically and internationally, their products, and innovation have been harnessed commercially.

FP 4: Complete support of aging society and lifelong learning

Achievement index: The goals include inventions, innovations to support the aging society, and caregivers for all groups of people. People of all ages are able to have access to lifelong learning. The manpower has been prepared to step into an aging society. The elderly people are active citizens; they are able to be self-reliant in society, and there are recruitment systems for elderly manpower.

FP 5: Creating academic excellence in sciences, social sciences, humanities and fine arts

FP 6: International hub of talent and knowledge

Achievement index: multidisciplinary and interdisciplinary body of knowledge which is critical to sustainable development through connecting Thai people with regional and international communities. Academic personnel excel in the fields of social sciences, humanities and fine arts, as well as in science, technology and innovation, and the University Prominence.

FP 7: Strengthening infrastructure in science, technology, and innovation of Thai higher education institutions

Achievement index: Thai higher education has a strong infrastructure in the fields of sciences, technology and innovation, as well as having high-level researchers and personnel in higher education institutions.

Three Flagship Mechanisms (FM)

FM 1: Reforming financial and budgetary system based on outcome-oriented

Achievement index: Unit cost reflecting quality higher education standards, outcome-oriented budget allocation models, and public and private higher education institutions can make use of the Higher Education Development Fund in cost-efficiency and cost-effectiveness manners.

FM 2: Promoting good governance, transparency and accountability

Achievement index: Access to data and information, as well as transparency and accountability of higher education institutions. Higher education institutions observe the principles of good governance.

FM 3: Upgrading database of higher education system to be reliable, accurate, precise, and stable

Achievement index: Database system links among units throughout higher education institutions to create big data. Data storage systems can support the processing and analysis of data on the policy of higher education, science, research and innovation.

Milestone of 5-year higher education development (2023 – 2027)

The three strategies of the 5-year higher education development (2023 – 2027), together with the ten key driving forces will be able to create significant phenomenon to achieve the intended goals in the year 2027, which will be divided into two phases as follows:

Phase 1: Higher education is the key enabler for Thailand's transformation in the Post COVID-19 pandemic

The first 3-year period of the development (2023 - 2025) will be the year for implementing 10 key driving forces that will include 7 Flagship Policies and 3 Flagship Mechanisms for each year with the following milestones as follows:

Milestone I: Manpower of all ages have been developed according to the philosophy of Thai higher education in all dimensions, which is in line with the needs of the agriculture, industrial, and service sectors in 2023.

Milestone II: Ecosystem strength of higher education will lead to pushing forward to the economic and social sectors by 2024.

Milestone III: Hub of international expertise by 2025.

Phase 2: Higher education for sustainable Thailand

Higher education creates a balance of the fair distribution of development benefits to all sectors and helps enhancing competitiveness in accordance with the framework of the 13th National Economic and Social Development Plan. The second phase phenomenon will have a duration of 2 years from 2026 – 2027, it is resulted from the implementation of strategy in accordance with the development of higher education with 3 strategies combined with the outcome of the 10 key driving forces. The outcome of these strategies will instigate higher education to have enough resources that will result in enhancing sufficient potential and can be utilized to their full potential. Each year, key milestones appear as follows:

Milestone IV: Higher education resources will be harnessed to their full potential within 2026.

Milestone V: Higher education developing the Thai economy and society sustainably from knowledge in social sciences and sciences with leaps and bounds research and innovation with no one left behind and becoming developed countries by 2027.

VISION '2027'

Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society

IMPACT

Human Achievement Index (HAI) = 0.7209 / Human Development Index (HDI) = 0.825

SUPER IMPACT

Thai higher education is an important mechanism for driving the country to transform as a developed country by 2027

Part

1

Higher Education Context

1.1 Environment and factors affecting higher education

Higher education is the key mechanism for producing and developing the country's manpower to have sufficient quality and quantity; as well as research by creating body of knowledge, technology, innovation; together with playing the role in academic services by suggesting and giving opinions to guide society truthfully and accurately based on academic evidence; and for the preservation of the decent arts and culture of the nation. In this regard, higher education, therefore, is considered as the main engine driving the development of the country in safeguarding all dimensions including social, economic, and environmental. The rapidly changing world has inevitably affected higher education including structural changes in population and societies—in conjunction with the rapid technological progress in the era of globalization, shifting economic conditions during the COVID-19 pandemic, adjustment to the global climate, degradation of natural resources and the environment, and stability of the political direction—all of these factors have affected and generated challenges for the roles of Thai higher education.

External factors affecting higher education

Social aspect

The structural changes in demographics and societies are one of the major challenges for the whole world. It is projected that by 2030, the world's population is anticipated to increase by more than 1 billion to become more than 8.5 billion (United Nations, 2019). The majority of the population around 97 percent which come from developing countries, and the population in all regions of the world will have increasing life expectancy and there will be decreasing number of newborn children, while the world's population in the age group of over 65 years will increase (PricewaterhouseCoopers, 2021). The United Nations statistics (2020) indicated that the world's population experienced the highest growth rate in the 1960s and this trend will decline continuously. It is anticipated that by the end of the 21st century, the world's population may experience a disruption in growth, alongside the decline of the fertility rate, and coupled with the population having longer life expectancy due to medical advances—all these factors will contribute to the transformation of the world's population structure to an aging society.

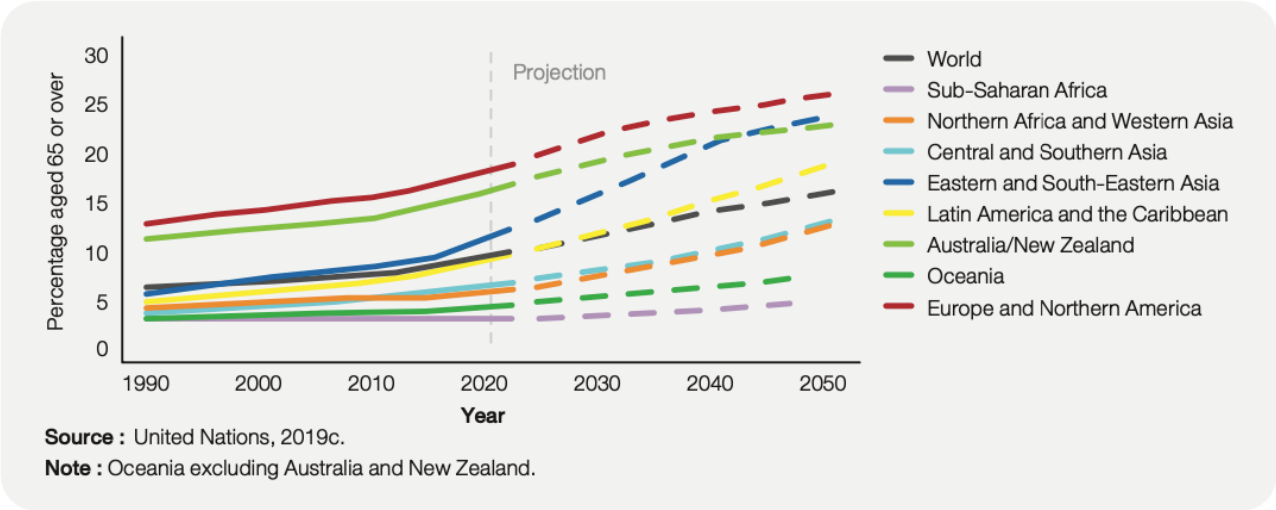


Figure 1 Percentage of the population aged 65 years and over between 1990 and 2050 (United Nations, 2020)

The demographic and social structure changes have posed economic challenges. Due to the declining fertility, the younger generation or the millennials or those born between 1980 and 1995 have higher expectations of overseas careers than the older generations. There is a consistent trend around the world for the younger generation, for example, 93 percent in Africa, 81 percent in Latin America, and 74 percent in the Middle East, after working for a certain period of time at home, these people would want to pursue their careers outside of their home countries. While this trend will have a positive economic impact on the destination countries abroad, it can lead to social and political tensions at home countries (PricewaterhouseCoopers, 2021). In addition, millennials are characterized by having self-reliant attitude towards performing their roles, like entrepreneurial thinkers, and they tend to seek work-life balance more than the previous generations. They don't want the obligation in their careers to confine their lifestyle and they think that flexible work is one way to achieve their work-life balance (Tamunomiebi and Wobodo, 2018).

Therefore, it is challenging to support the aging manpower to remain in the employment system, as well as to create sufficient employment during the transitional period for the existing population to cross over to the aging population (United Nations, 2020). The public and private sectors can play a significant collaborative role in creating a flexible transition for the upcoming retirees by formulating the following measures. (1) Financial incentives, such as reform of law and regulations for pension and remuneration. (2) Investment in Education for All, such as promoting lifelong learning, for example: training; lifelong upskilling, reskilling, and new skilling throughout employment; (PricewaterhouseCoopers, 2021). In the future, lifelong learning will become even more important as it will increase knowledge and skills to keep pace with changing technology and to certify necessary skills needed throughout employment life. In addition, the transition to

an aging society is one of the economic incentives to invest in innovations to replenish manpower by utilizing robots and artificial intelligence (United Nations, 2020).

Transforming into an aging society is a challenge and also an opportunity in terms of social services and healthcare. When the capacity and health of the elderly deteriorate, there will be a question of who will take care of the elderly. Such questions will create employment opportunities and innovations to support elderly care, such as aged care robots, intelligent sensors to track the behavior and health conditions of the elderly, as well as research that promotes longevity, such as antioxidants and cell regeneration, etc. There should be a promotion to invent technological innovation that might lead to a re-definition of “old age” (United Nations, 2020). As for Thailand, the government needs to consider developing people of all ages to their full potential, particularly healthy elderly people. This development will assist elderly people to be able to support themselves and be able to provide social services. It will also be an economic opportunity because the elderly have a demand for products and services, such as health and medical services, and nursing homes which are opportunities for developing innovations to meet the needs of the elderly (NESDB, B.E. 2564).

Technological aspect

Technological advances are more evident in globalization, where technology has played an important role in human daily life. The Internet of Things (IoT) devices are predicted to increase nearly triple from 8.74 billion in 2020 to more than 25.4 billion devices by 2030 (Statista, 2021). All of these devices will work in connectivity with smartphones and household items. From the millennials’ point of view, technology is not just a device, it is interconnected as a "natural language" (PricewaterhouseCoopers, 2021). Moreover, zoomers or those who were born between 1996 to 2012 which is globalization period who harness borderless technology to access information and news from around the world with the click of a button and the internet. This generation has more technology capabilities than the previous generations (Tamunomiebi and Wobodo, 2018), they can make many changes, ranging from changes in the labor market, the formation of social structure and lifestyle (United Nations, 2018). For example, during the COVID-19 pandemic, technology enabled people to work remotely, reduced the need for daily commuting, and enabled health workers to track patients' symptoms through smartphone communication. As a result, technology interacts closely with globalization and it is critical in many areas, as well as driving the efficient use of resources, reducing CO_2 emissions, improving agricultural productivity and water quality, sanitation, health, and improving learning outcomes. In this regard, education personnel should receive adequate training on using digital technology and tools to support teaching and learning (OECD, 2021).

Rapid technological change is one of the major challenges because in order to generate rapid economic growth, artificial intelligence and automation with potential will be harnessed

in conjunction with the global value chains (United Nations, 2020). At present, each business designates its own position in the digital business models so as to enhance the leverage of its competitiveness (PricewaterhouseCoopers, 2021). Although technological advancement increases productivity, however, it has an impact on the labor market. For example, computers and digital systems have been utilized to support high-skill manpower. Meanwhile, robotics and some forms of automation are replacing medium-skilled manpower (United Nations, 2020). However, in the past, workers whose jobs related to certain tasks that needed to have social interaction with other people were still irreplaceable by automation (Autor, 2015 as cited in Deming, 2017). According to a forecast published by Deloitte Access Economics (2017), by 2030, occupations with soft skills will account for two-thirds of all occupations. In the case of Thailand, technological advancement will also have an impact on the Thai labor market, particularly the mismatch between the skills of the manpower and the necessary skills required for the jobs. In this regard, skills related to high technology and less-skilled manpower will be replaced by robots and machines (Office of the National Economic and Social Development Board, 2021).

Economic aspect

The global economy remains uncertain due to the COVID-19 pandemic, after shrinking by about 3.5 percent in 2020. The global trade volumes were expected to grow by 5.5 percent in 2021, and decrease to 4.2 percent in 2022. Meanwhile, global trade is consistent with the recovery of world activity, it is expected that the global trade volumes will grow approximately 8 percent in 2021, and will decrease to the level of 6 percent in 2022 (International Monetary Fund, 2021a). However, the COVID-19 pandemic will still have an impact on employment. Low-skilled manpower is the most affected group of people (International Monetary Fund, 2021b). In addition, the automation in the food service, agriculture, manufacturing, and construction sectors is another factor that impacts this group of manpower. However, the COVID-19 pandemic has given rise to the construction of large-scale public health infrastructure and other investments related to human resources (Chebly, Schiano, and Mehre, 2020).

For Thailand, the economic growth has been contracted by 6.1 percent in 2020 which was a result of lower external demand. This has impacted the trade and tourism sectors. The disruption of the supply chain, decline in domestic consumption, and sequences of the COVID-19 pandemic have created many impacts on the Thai labor market. The main impact is the rising unemployment rate, which doubled from 1 percent in the first quarter of 2019 to 2 percent in the second quarter of 2020 (The World Bank, 2021a). It is considered the highest level of unemployment since 2009. The employment losses occurred in all sectors, particularly the manufacturing sector and the wholesale/retail trade. However, in order to recover in the post-pandemic, the World Bank has advised that good jobs must be created in high-productivity sectors based on the use of intellectual capital to lead to new advances in economic activity, as well as providing policy advice

related to education in the short and long-term implementation. For the short term, training programs are to be organized for skill enhancement, both upskilling and reskilling in order that the manpower will be able to return to employment. In the long run, it is to build a demand-driven and results-oriented manpower development system by improving skills training courses and modernizing the recruitment service system (The World Bank, 2021b).

Environmental aspect

Climate change, as well as natural resource and environmental issues are one of the major challenges. Our nature is changing by human activities—including ecological disturbances; loss of biodiversity and wildlife; land use alterations; degradation of air quality, water and soil—these are the consequences of economic development and human ways of life. The depletion of natural resources is beginning to manifest itself from phenomena such as climate change, which causes global warming. Scientists have forecasted that when the climate rises above 2.5 degrees Celsius—it will cause irreparable damage. Climate change is an independent progressive trigger activating changes in natural systems and it will trigger other more exacerbated phenomena (United Nations, 2020). This will include rising sea water levels, ocean acidification, drought, desertification, etc. In the future, climate-related risks will depend on the rate, periods, and maximum temperature of global warming (Intergovernmental Panel on Climate Change, 2018).

Climate change trends and the shortage of resources are interconnected. It is predicted that by 2030, the increasing number of the world's population will activate the increase of food demand by 35 percent. The demand for food products will be contingent on the income of the population, these include vegetable oil, milk, meat, fish and sugar, which will have an impact on energy and water supply. Moreover, in the next 60 years—as a result of global climate change--agricultural productivity can be reduced by as much as one-third of Africa's land area, and the global demand for water supply and energy will increase by 40 percent and 50 percent respectively. However, many countries around the world have implemented the integration of human resource development along with their ecological footprint. For example, by 2016, the United Kingdom had generated all its electricity without using coal, while Portugal could generate all its energy for a week by means of renewable energy sources alone. In addition, businesses directly affected by problems relating to water supply, soil and energy issues have developed innovations to cope with these impacts. One good example is that food producers and processors in South Africa have become renewable energy producers by taking waste from poultry and wastewater from factories converting it to renewable energy for factory use and creating added value (PricewaterhouseCoopers, 2021). Such endeavor is another major challenge in search of solutions to the climate crisis, natural resources, and environmental problems by applying technology, innovation, and formulating policy to look for effective resolutions. The solution has not only reduced the cost of production, storage, and using renewable energy technology, but it also helps changing agricultural practices e.g.,

irrigation technology, research on biodegradable products, and new product design to reduce waste (United Nations, 2020). In addition, according to the data of PricewaterhouseCoopers (2021), the growth of alternative energy will have resulted in boosting employment in other energy-related industries.

Meanwhile, the fossil fuel industry is declining rapidly due to the present trend that the business sector has given importance to the Sustainable Development Goals by adjusting its business model responsibly. In taking into account the impact on society and the environment, the Thai government deems it important to tackle all these environmental issues. Therefore, Thailand has geared toward the Sustainable Development Goals and has ratified the United Nations Framework Convention on Climate Change (UNFCCC), by setting up a target to reduce 20 - 25 percent of greenhouse gases by 2030.

As for the fields of energy, transportation, waste and industrial processes, along with proposals to contribute to greenhouse gas reduction, such as creating food security under the sufficiency economy philosophy by applying new theoretical approaches to agricultural and land management to promote budget allocation and economic risk diversification at the household level, and create sustainable management in community forests to enhance food security at community level (Thailand Climate Change Adaptation Information Center, 2021). However, addressing the country's climate management remains challenging due to the lack of technical and technological development and limited support for international cooperation in this subject (Office of Natural Resources and Environmental Policy and Planning, 2010).

Political aspect

Global political issues consist of three megatrends namely: globalization, integration, and democratization. Globalization refers to transnationalization, which is different from integration in the form of agreements between states and territorial dimensions, where globalization is the most prominent megatrend (Lebedeva, 2019). Globalization results from interaction by means of communication, transportation and information technology to connect individuals, communities, organizations, governments, and countries around the world more quickly and massively. Things can spread all over the world in a short period. This results in immediate awareness or impact of happening instantly. It includes news and information; diseases; climate change; or even terrorism; have obliged international organizations to play roles and management, together with concluding different international agreements to facilitate more collaboration among countries. Each nation needs to give up some of its national interest to join and collaborate with international organizations in order to protect its own benefits. The direction of global geopolitics in the future will be a multipolar world and a superpower is not restricted to one nation or group. This is a consequence of greater interconnectivity and inter-dependency among nations by means

of regional grouping based on geographical location and common ideologies. Therefore, in some instances, decisions on domestic issues must take into account other countries (Kriangsak, 2016). The geo-political megatrend nowadays has extensive implications for global economic and social consequences. Countries need to adapt to those changing trends, which are interconnected. Shifting economic and political polarization that is expanding considerably has a vast impact on the economy and security. As a result, the government sectors must play a pivotal role in formulating the country's guidelines and policies, as well as economic, social, and political aspects to keep pace with the changing global situation. Consequently, it is questionable how Thailand will come up with a strategy to adapt to the world's current changing economic and geo-political polarities.

One of the political issues affecting the image of Thai higher education is that the Thai public in general perceives higher education has often been interfered with or disturbed by the political sector in terms of teaching, research, and social services. Therefore, the academic freedom and independence of Thai higher education have always been debatable. In reality, the credibility of the higher education system in some countries is declining. Thus, it is a challenging issue for higher education to heighten its credibility. It cannot be denied that access to higher education is widely open, as well as preparing and instilling students' awareness and becoming creative citizens. The student's attributes focus on creating critical thinking and creativity. In addition, building public trust bridges the gap between universities that are "institutions of expertise" and the public, all these are results of the political climate (Sursock, 2018).

For Thailand, the government sector has a vital role to play in supporting or driving the higher education system efficiently by means of formulating policies, guidelines, and regulations relevant to education. Such government initiatives are implemented to establish a higher education administrative system based on good governance. It has also fostered higher education to harness the potential of higher education institutions and drive its mission in accordance with its own uniqueness that can respond to the needs of the community that are in line with national policy. However, the current trend of global freedom, in conjunction with political ideology and academics are affecting the younger generation. There has been a change in the way of thinking and living, and wider exposure to choices in education and career. Therefore, the government sector should formulate policies or guidelines that would encourage higher education institutions to adapt to global political trends more suitably. Consequently, higher education plays a significant role and serves as a key mechanism in driving the country as a source of the body of knowledge accumulation and production of manpower that will serve as a mechanism for the country to escape the middle-income trap. Higher education institutions will pursue their academic excellence based on their uniqueness, as well as engaging in their freedom in terms of administrative and academic affairs to have agile operations. In this regard, higher education needs to be managed systematically and

steered in the right direction in order to be internationally recognized and keep pace with the evolving globalization.

From the previously mentioned factors, higher education has encountered many challenges. According to data and information published by the Organisation for Economic Co-operation and Development (2021), the Thai labor market faces an imbalance between the skills of the supplied manpower and the skills required by the labor market. During the period of 2011 - 2018, there was an acute shortage of skills in many professions and industries. The most serious problems occurred in the deficiency of skills among experts and supporting professionals such as health professionals, legal, social, cultural and related occupations. There was also shortage of supporting personnel such as clerks, handicrafts and related trade, factory workers, machine operators, as well as fundamental workers. These indicated that skills shortages are found in spectrums of all skills, and there was an excess supply of the labor market or skills that exceeded the demand of the labor market. There was ample skilled manpower in the agricultural sector, which corresponded to the declining importance of the agricultural sector in the labor market. On the contrary, in the industrial sector, there was a shortage pattern of both skills and supply levels. Similar shortage patterns of professions also occurred in the education sector with the largest skill shortage, and the agriculture sector has the largest surplus of supply.

These imbalances can be the result of many factors, including supply inadequacies, skills of graduates did not meet requirements of employers, and working condition was not attractive. In addition, the shortage of skills observed in occupations reflects a shortage of intellectual skills such as mathematical reasoning, writing and reading for better comprehension, as well as some social skills such as service orientation and technical skills. It has been found that the most critical shortages included literacy in computer and electronic devices, clerical knowledge, and customer and human services. When considering the hostility of the key global trends for Thailand such as the aging population, globalization, and automation system, as a result, the shortage of cognitive and social skills tends to become more pronounced. In addition, the COVID-19 pandemic has further aggravated the shortages of public health services in Thailand.

The data on occupational skills indicates that the Thai labor market has a share of manpower that does not match the qualification level and/or field of study. Data from 2018 showed that 7.8 percent of the manpower is underqualified, while 34 percent of them are overqualified. This phenomenon is consistent with the facts, that is Thailand's past employment manpower concentrated on low-skilled occupations, in other words, it may reflect that employers are having trouble finding the right level of qualified manpower and resorting to hiring underqualified manpower. However, it can be noted that under-qualified manpower does not require skill for menial jobs because manpower can acquire skills informally, which the system of Recognition of Prior Learning can help certifying these skills and provide employers with an evident view of manpower capabilities. Therefore, in order to prevent imbalances between education, manpower

skills, and the labor market, there should be a strengthening of the response of the education system to meet the labor market needs both now and in the future. More attention should be focused on work-based learning, as well as lifelong learning to increase opportunities for upskilling and reskilling of the population, together with the dissemination of information about the labor market and the required skills for the labor market.

In short, social, technological, economic, environmental, and political factors are all interconnected since human resources are both drivers and those affected by such factors. The rapid changes in population structure and the incoming of the aging society along with the rapid technological progress in the globalization; the global economic situation during the COVID-19 pandemic; climate management; natural resources and environmental issues; and political direction—all these issues require foundation of philosophy in asking questions and finding truthful answers. There is a great need to promote and develop human capital in both the age group and non-aged group by means of lifelong learning with flexible learning pathways in parallel with developing transversal skills to prepare for the passage into the future. A human being needs to adapt to changes and learn to lead a valuable and meaningful life by means of critical and innovative thinking; communication and interpersonal skills such as communication, organization, collaborating with others, etc.; intra-personal skills such as discipline, enthusiasm, perseverance and self-motivation, etc.; global citizenship, i.e. tolerance, openness, respect for diversity, understanding differences between cultures, etc.; and media and information literacy (UNESCO, 2014). All these attributes are key elements to becoming a citizen with 21st-century skills and knowledge, which are awareness leading to creativity with an emphasis on critical thinking with decent judgment. The ultimate idea is to create and develop novel and valuable things to keep pace with the major changes in the world in various dimensions by applying knowledge and skills to daily life and further increasing productivity leading to sustainable development of the country in all dimensions under the principle of “No One Left Behind”.

Internal factors affecting higher education

Comprehensive higher education management covers issues relating to learners, research and innovation, academic services to society, and institutional management. Preliminary analysis includes the quality of graduates, according to the report on labor problems for employers who want to employ graduates, but do not have many opportunities to select graduates of their choice. At the same time, the unemployment rate of graduates remains, this reflects the gap between the skill level of graduates and the required skills expected by employers. In addition, employers also have views on the qualifications of graduates who lack soft skills in human and social relations.

Soft skills emphasize social responsibility and accountability, which are necessary in performing tasks. As for the issue of data analysis on research, it has been found that higher education institutions are the sources of academic work, including the transfer of research for utilization, which tends to increase. However, they are concentrated in some institutions and at the same time some institutions do not have international publications at all. Moreover, the problem of balancing the workload for lecturers between research and teaching workload is still problematic for Thai higher education institutions. Potential for research is one of the globalization trends for indicating performance in higher education management, which has a direct effect on university ranking, as well as competitiveness at the international level. Therefore, the university ranking of Thai higher education institutions on the world stage is also a reflection of the quality. It was found that the overall ranking of Thai higher education institutions tends to decline from the rankings of QS and THE, but in some disciplines, there is a good tendency in the ranking.

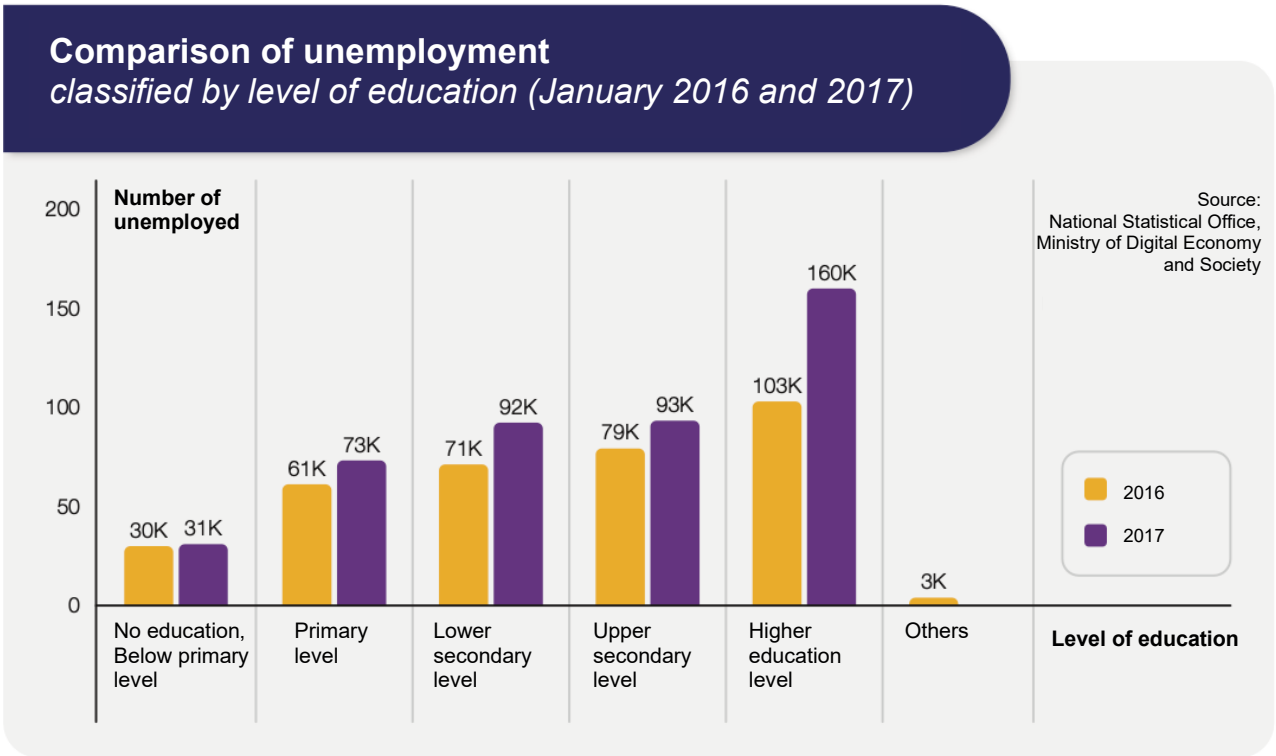


Figure 2 Comparison of unemployment classified by level of education

Although **access to higher education services** can be analyzed from the Gross Higher Education Enrollment Rate, in this case, it refers to the ratio of the number of Thai students pursuing higher education (non-age classification) to the total population aged 18 – 22 years old of the Thai people. It was found that access to higher education services is quite high compared to other countries in the region, and it tends to be higher in the future. However, over the next 20 years (2016 - 2036), the impact of demographic structural changes will lead to a steady decline in student numbers, compelling Thai higher education institutions to compete in attracting more learners and at the same time coming across financial risks.

According to UNESCO data, **access to higher education services** compared to the proportion of the Thai population aged 18 – 22, who enrolled in the Thai higher education system in 2016, was at 49 percent. It is considered one of the highest enrollment rates in higher education in the world. This figure accounts for about half of the total population aged 18 to 22, which indicates good access to higher education. However, in driving the government policies for the country to escape the middle-income trap, as well as to be on par with the international or developed countries of the world, it is still necessary to focus on producing graduates in both quantitative and qualitative dimensions at the same time. Therefore, higher education must take the results of the university ranking from various agencies around the world into consideration together with the potential in various dimensions. These include quality of curriculum, international academic collaboration, exchange of learners and personnel, and higher education institutions having to define their roles clearly in the global platforms. In addition, higher education institutions must take into account the changes in demographic and social structure, which have led to a steady decline in the number of students. Consequently, higher education institutions have to adapt accordingly and develop themselves in order to avoid financial risks.

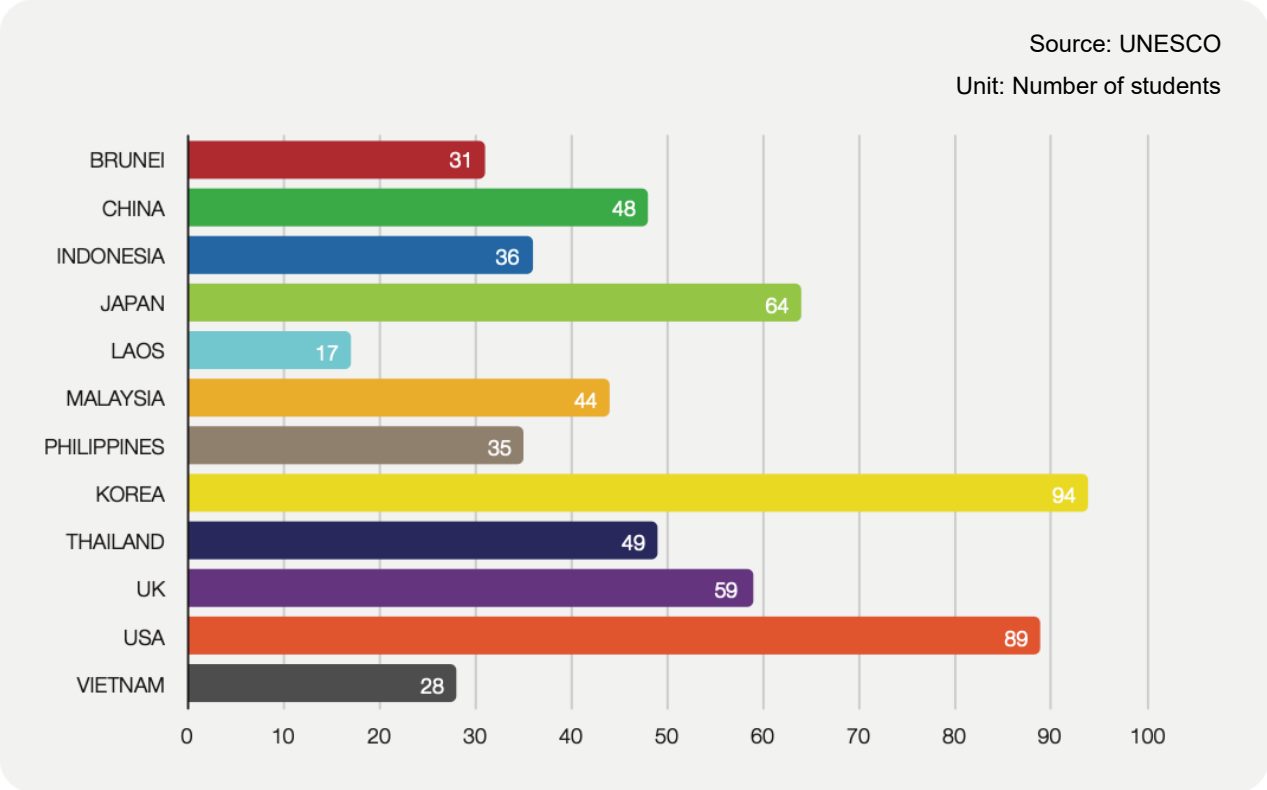


Figure 3 Proportion of the population aged 18 - 22 having access to higher education in Thailand compared with other countries in 2016

However, **equity and fairness** to access to higher education remain a problematic issue as students from high-income families often excel and have more opportunities to study in high-quality public higher education institutions with lower educational costs. Though the Thai government supports students from low-income families through the Student Loan Fund, but students who graduate from such loan continues to lack opportunity for employment and their remuneration are usually paid lower than their qualifications. As insufficient remuneration for living expenses prevented them from repaying the student loans, it became entangled problems for the burden of the national budget and barriers to access to higher education, as well as reflecting that the quality of education management could not improve the quality of life as it should be. In terms of education for persons with disabilities in higher education, there are still problems in the establishment of a supportive system for people with disabilities and the understanding of personnel responsible for providing education fairly and equally to normal students.

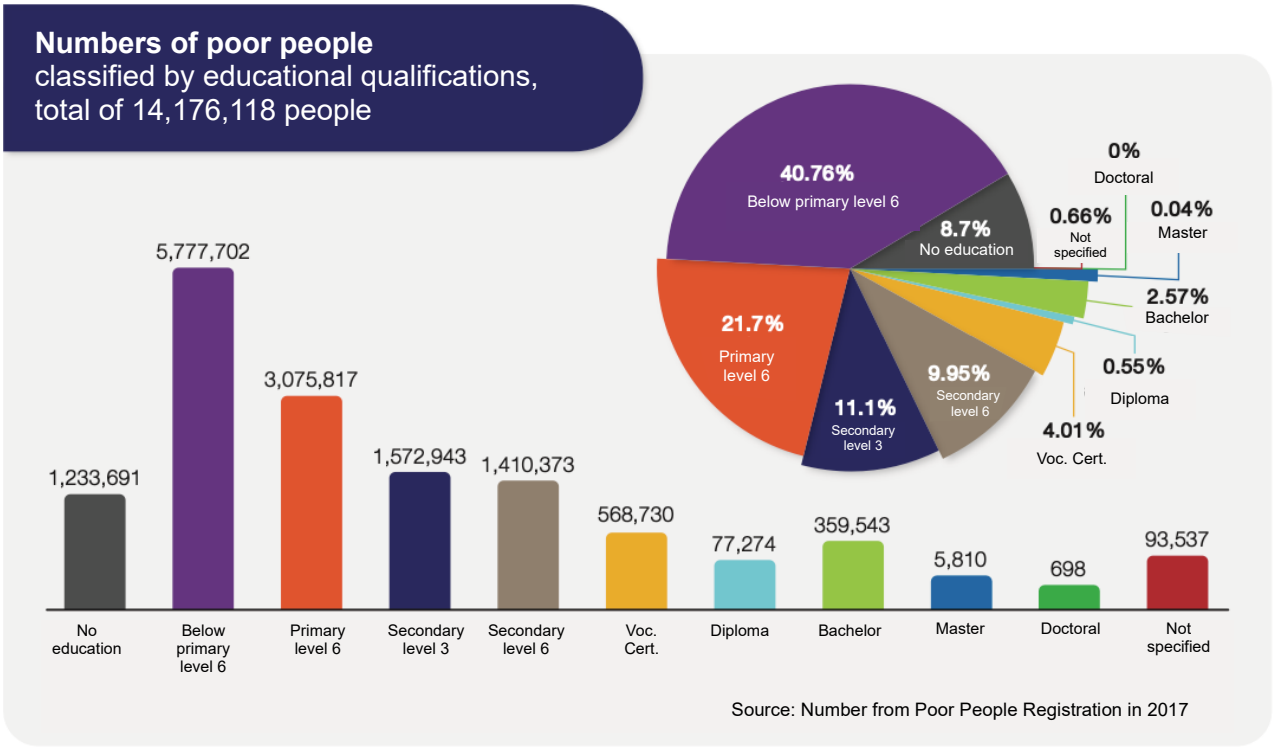


Figure 4 Numbers of poor people classified by educational qualifications

The administrative efficiency of both the higher education system and higher education institutions is also an important issue for development, for example, the planning system must be in line with the budget allocation system. It also lacks a system to evaluate the efficiency and effectiveness of the higher education administrative system, which makes it impossible to direct the success of the whole higher education management systematically. In terms of information database systems, it is still lacking good quality, accuracy and update. There is also a lack of analyses on graduates' productivity indexes, educational waste, and research evaluation systems in the country as a whole. The budget allocation system cannot create incentives to encourage higher education institutions to develop efficiency on cost-effective manner. There is also a lack of manpower planning for each discipline. It reflects that the administrative system of higher education institutions is characterized by weaknesses and slow adaptation including the inability to respond to changes in society and globalization.

Acting in response to changing contexts is a challenge for Thai higher education in confronting the abrupt and severe global economic and social competitiveness. As a result, there is an urgent need to enhance the internationalization of Thai higher education to strengthen higher education to produce skilled and competent manpower to meet changing labor needs and to support the free movement of workers. Transforming education management to be more international by seeking cooperation with foreign partners in the form of joint ventures or establishing agreements to organize joint education by using international curriculum and standards. There must be policies that attract and support learners, lecturers, and international education service providers from different

countries. The internationalization of Thai higher education must be further strengthened together with the commercialization of research efforts and connecting the body of knowledge with practical works in the government and industrial sectors, including agriculture and service sectors, as well as communities and civil society so that all sectors can work together to drive the country towards its common goals.

Figure 5 Global Innovation Index 2017 – Global Ranking

1.2 Relevant policies, strategies and plans

The analysis of factors affecting higher education above reveals the trends that Thai higher education will have to adopt in the future. However, analyzing strategies and important policies at all levels related to higher education management will link with the direction of national development towards formulating goals, strategies and guidelines. Moreover, it will help formulating a clearer direction for the country's production and manpower development guidelines. Thus, the summary of the strategies and policies is the following.

1. 20-Year National Strategy for 2018 - 2037

The 20-Year National Strategy for 2018-2037 is Thailand's first long-term national strategy, serving as a guiding framework for the country's development in all dimensions throughout the next 20 years. It sets the vision and development goals based on the country's motto, "Stability, Prosperity, Sustainability".

Formulation of the long-term direction of national development must cover the direction of growth of the country's economic and social conditions; solving problems and reinforcing to get rid of weakness that hinders the development. Therefore, in order to formulate the direction of the country to have clear guidelines to meet the goals in all dimensions, the driving forces consist of 6 strategies below.

Strategy 1 National security

(1) People live well, eat well, and are happy; (2) the country is stable in all dimensions and at all levels; (3) military, security agencies, public sectors, private sectors, and the public sectors are ready to prevent and solve security problems cohesively; (4) Thailand's security role is appreciated and recognized by the international community; and (5) security management is carried out effectively with tangible achievements.

Strategy 2 National competitiveness enhancement

(1) Thailand is a developed country with a stable and sustainable economy; and (2) Thailand's competitiveness is uplifted.

Strategy 3 Human capital development and strengthening

(1) Thai people are decent, talented, qualified, and ready for the living pattern in the 21st century; and (2) Thai society is endowed with a conducive and supportive environment for the development of people throughout their lifetime.

Strategy 4 Social cohesion and just society

(1) To create justice and to reduce inequality in all dimensions; (2) to decentralize economic and social prosperity, providing opportunities for all sectors to participate as power in the development process at all levels; and (3) to enhance the capacity of local communities to carry out development, to be self-reliance and self-management to build quality society.

Strategy 5 Eco – friendly development and growth

(1) Conservation and preservation of natural resources, environment and culture by passing these heritages to the next generations sustainably and balanced; (2) rehabilitation and reconstruction of natural resources and environment base to reduce negative impacts from the country's socio-economic development; (3) harness and create growth based on natural resources and environment to be balanced within the capacity of ecosystem; and (4) to raise the paradigm in order to shape the country's future in terms of natural resources, environment and culture on the principles of participatory and good governance processes.

Strategy 6 Public sector rebalancing and development

(1) The public sector has a work culture that focuses on the achievement and common good of the people so as to be able to serve the public conveniently, quickly and transparently; (2) the public sector is more lean and ready to adapt to changes; (3) the public sector is transparent and free from corruption and misconduct; and (4) the justice system is for the common benefit of the country.

2. Master Plan under the 20-Year National Strategy

"Master Plan under the National Strategy" is formulated to clearly define the directions, goals and indicators of the national development under the National Strategy. The development period under the National Strategy is divided into 4 phases of 5 years each, which will allow the development direction to be flexible, adaptable to the changing conditions of each period. It will enable improvement of the implementation of development to be efficient and effective continuously, and it is classified according to 23 issues of the development.

In terms of the implementation of the master plan’s driving force through the mission of higher education, the roles of policy and the mission of higher education institutions are taken into account. The relevant issues can be summarized from the formulated 17 master plans with issues namely: (1) security; (2) foreign affairs; (3) agriculture; (4) future industry and service business; (5) tourism; (6) modern entrepreneurship, small and medium enterprises; (7) Special Economic Zone; (8) values and cultural modification; (9) human potential throughout the life cycle; (10) learning development; (11) sports potential; (12) social power; (13) fundamental economy;

(14) sustainable growth; (15) public service and government efficiency; (16) anti-corruption and misconduct, and; (17) development of research and innovation. The formulated 17 master plans above, it can be synthesized into the roles of higher education in driving the master plan as follows:

Instilling Thai people with the necessary learning skills and essential skills of the 21st century by managing to elevate Thai higher education to higher standards with good quality. The implementation includes enhancing effective mechanisms in adjusting approaches and systems of teaching and learning in higher education to be more conducive to the adaptation of higher education institutions that are affected by changes in many factors. These include population decline, economic and social growth trends of the country, digital technology transformation, expectations for the quality of graduates that meet the needs of industry and service sectors and access to higher education, etc. If higher education achieves its main goals of creating and developing quality Thai people, it will be able to meet the development issues under several master plans. This is because human resources are the main factor of national development.

Organizing systems to support lifelong learning management includes developing an environment that is conducive to creating access to higher education by establishing a credit bank system to enable broader educational styles to be consistent with the living patterns of people of the 21st century. Moreover, the implementation should also include setting directions to support the development of skills for the in-service labor forces and the elderly.

Creating and developing body of knowledge, research, infrastructure in science, technology and innovation to escape the middle-income trap. In this regard, the means of science and technology are needed to drive capacities in all dimensions of the country. Therefore, various sectors are expecting the role of higher education as a source of knowledge and expert personnel to improve the quality and solve problems. This includes promotion of research, development and application of innovation in the country's target agricultural sector so as to create value for agricultural products—extension of infrastructure to be a source of support for technology transfer both domestically and internationally. Promote the utilization of intellectual property and promote the modern medical industry with added value, etc.

Promoting Thailand's status and role in the international community through exchanging of body of knowledge, technology, and innovation; as well as learning best practices from countries with good potential in fields that are beneficial to Thailand's development—in addition, strengthening cooperation in education enhancement, human resource and labor development to increase the capacity of Thai people, and attracting talented overseas Thais by taking into account the balance between economic development and sustainability.

Enhancing higher education institutions as crucial mechanisms to drive master plan issues through the mission of providing academic services by transferring the body of knowledge to community, service, and industrial sectors. For example, jointly develop the potential of farmers to have access and harness agricultural technology and innovation to develop new industrial skills for the preparation for technological changes. To enhance the potential of tourism business, as well as to provide knowledge on product development, to register for protecting intellectual property, and to conserve local intelligence. In addition, the education sector is an important network to link people, communities, and government sectors in the endeavor for local development mechanisms at the area level.

Developing management in response to bureaucratic reform, all units in higher education must adhere to good governance principles by encouraging staff to operate transparently, fairly, and accountably. The implementation should help improving the management systems and authoritative structures to facilitate the reduction of operational discretion of the authorities with clear and verifiable practices. Allocation of the budget must respond to the goals according to the National Strategy. There must be establishment of monitoring and evaluation of the achievement of the implementation by providing opportunities for stakeholders to participate in the monitoring and evaluation process, and dissemination of public reporting of the follow-up and evaluation of the achievement of the goals. Strengthen personnel management in the public sector in accordance with the true merit system, and elevate their high knowledge with critical thinking skills and adaptability to keep up with changes. Build strategic leaders at all levels of government agencies to be strategically thinking leaders. Develop government service models through the application of digital technology and focus on service recipients as a priority.

3. Interim Master Plan under the National Strategy resulting from the COVID-19 pandemic during 2021 – 2022

The interim master plan has been created as a result of reviewing the master plan to be in congruence with the current situation. The national development goals are maintained in accordance with the National Strategy and will be implemented in parallel with the 23 master plans in 2 years (2021 - 2022).

Determining the direction of development amidst the crisis and uncertainty has given importance to developing the country's potential for resilience. **The national development under the concept of resilience gives importance to dimensions that the country is ready to cope, adapt and transform (CAT)** as follows: Ready to cope: reduce vulnerability by eliminating existing weaknesses and limitations and be ready to fully manage all situations under available resources. Adaptation: alteration of patterns and operational approaches in accordance with changing trends and uncertainties, risk diversification and adaptation to create opportunities from changes. Transform: structural and fundamental modification such as regulations, laws, policies, and institutions in order to turn crises into opportunities, and to move towards quality, inclusive, and sustainable growth **based on the sufficiency economy philosophy with the 3 stages of development: survive, sufficient and sustain.**

Goal: People can endure to survive and have occupation. Vulnerable groups have access to universal care, job opportunities and income distribution locally. The country's economy has returned to normalcy and a foundation to support the rehabilitation and the development of a new economic structure has been laid; in this regard, emerging challenges of the COVID-19 pandemic include the following.

1) Strengthening the foundation of the local economy

Reinvigorating the domestic economy from the fundamental local level with the distribution of economic opportunities at the local level, as well as elevating the potential of domestic businesses, especially SMEs, which are an important source of employment to cope with future changes.

2) Enhancing the country's competitiveness to support long-term sustainable future growth

Improving the manufacturing sector to enhance long-term growth potential by building strengths and diverse economic engines, starting with promoting the various manufacturing sectors in which Thailand already has strengths, including medical services and health tourism, agriculture, food industry, and automotive. In addition, manufacturers should be strengthened to have a better capacity to produce added-value products and to be able to adapt appropriately to global changes.

3) Developing human capital's capacity and quality of life to serve as the main driving force for national development

Developing human resources' potential to be a significant force in strengthening the domestic economy and enhancing long-term economic growth.

4) Improving and developing enabling fundamental factors to promote the national rehabilitation and development

The development and strengthening of fundamental factors include infrastructure; laws and regulations; functioning and guidance of government services; body of knowledge and innovation; enhancement of security; risk management; as well as mechanisms for participation of various network partners to support the prevalence of digital technology; and promoting the adaptation of various sectors to keep pace with changes to support the national development effectively.

4. National Reform Plan

4.1 Performance

In the past, higher education has been implemented according to the National Reform Plan in 2020 as follows:

1. Issue on educational service, relevant government agencies, including the Ministry of Education and MHESI have continuously implemented reforms in the education service sector since 2017. The implementation emphasizes developing partnerships with the world's leading higher education institutions to operate and develop study programs in collaboration with leading Thai higher education institutions. It incorporates striving to produce manpower in response to the needs of potential industries, as well as supporting the development of the Eastern Economic Corridor, which is a special economic zone of great potential. Key projects include (1) manpower development projects in the fields of engineering, technology and innovation to support investment and industrial capacity building in the country and in the region by means of education cooperation under the KOSEN Project between Japan and Thailand; (2) academic cooperation between the King Mongkut’s Institute of Technology Ladkrabang (KMITL) and the Carnegie Mellon University; and (3) the establishment of the Asian Institute of Hospitality Management with the academic collaboration of Les Roches Global Hospitality Education, which is one of the top three private higher education institutions in hospitality business management in the world.

2. Issue on higher education human resources development, the past operation relevant to government agency, particularly, MHESI has developed quality higher education curriculum and has developed manpower in accordance with the country's development direction through important plans/projects, such as developing the higher education qualifications framework and higher education curriculum standards to meet the requirements of today's learning outcome, and advancing cooperative education and work-integrated education (CWIE). The context of rapid socio-economic change has resulted in the increasing demand for highly skilled workers in a variety of industries, such as higher-order thinking skills. However, the readiness and academic competency of lecturers, as well as the infrastructure and equipment for teaching and learning are still inadequate. The situation is aggravated by limited efficiency in educational resource management that may prevent the up-to-date curriculum development to keep pace with the changing circumstances. In addition, the development of curriculum in the fields that are in line with the industries, such as science, technology and innovation, has a relatively high cost. Thus, higher education institutions tend to produce graduates in comparatively less cost fields such as social sciences and humanities, which supply more human resources than required. Consequently, graduates are less likely to be employed, or employed in different fields of studies, and paid lower than their qualifications. This, therefore, will affect the development of the country, so the authority should aim to encourage higher education institutions to develop quality curricula and teaching, to be able to produce advanced manpower that meets the needs of each industry. The emphasis should focus on the development of a more modern and more flexible curriculum that can be adapted to fit the changing context more suitably. Curriculum development should be based on the collaboration of relevant organizations in all sectors, as well as covering the core competencies necessary for work, together with solving problems and essential skills for the 21st century as required by the competency-based curriculum. In addition, the designing of the curriculum should support lifelong learning management through essential approaches/measures, such as module-based teaching and learning systems, credit bank systems, and/or micro-credential systems, in order to encourage people of all ages to access educational qualifications without difficulty and be able to continuously increase upskilling and reskilling implementation more readily.

3. Issue on establishment of research and development center, in 2019, Thailand had a total number of 159,507 full-time equivalent research and development personnel. There is a 15 percent increase from the previous year 2018, when the total number of such personnel was at 138,644. The number of full-time equivalent of such personnel is only 24.0 per 10,000 people, which is considered low compared to Taiwan. In Japan and South Korea, which are at 70 - 111 per 10,000 people, most of these personnel are in the private sector. Meanwhile, the number of science and technology workers in Thailand in 2018 was 4,091,397 or 40.0 percent of the total number of graduates. Nevertheless, Thailand still has a deficiency in collecting accurate data on

the employment of graduates after they finish their education that can reflect the growth of their career path in the fields of science and technology in the domestic labor market. At present, these workers tend to pursue other occupations that do not match their existing knowledge. This reflects that Thailand faces a situation of losing a lot of opportunities from the development of a large amount of science and technology personnel. This includes the loss of opportunities for innovation in the country. In this regard, the government sector should reinvigorate budget spending for the development and drive science, technology and innovation missions to be stronger and more sustainable, with the aim of increasing the proportion of public investment from the current 22 percent to 30 percent by 2022. This should include investment to develop the country's innovation development ecosystem in the innovation zone, the Eastern Economic Corridor (EEC), to raise the level of production of entrepreneurs in line with the development direction towards Industry 4.0.

4. Issue on creation of super workers and connecting workers to the market in a comprehensive manner. In the preceding operations, the government sector has collaborated with relevant sectors to develop education systems and study programs, such as a Next Generation of Higher Education Project (A New Breed Graduate Program) and the Competent Manpower under 7 years period (2020 – 2026). The plan is to produce a new breed of graduates and a highly competent and high-potential manpower for working in new industries towards new S-Curve by applying curricula and instruction that emphasize creating learning experiences by means of practical work in the real environment through collaboration with business operators or industrial sector under 30 pilot study programs toward degree and non-degree. In the past, MHESI, in collaboration with 19 higher education institutions has developed 30 pilot courses incorporating 9 skills in 12 industrial fields, and 8 professional groups. In addition, the pilot project includes a competency-based short-term vocational training program for the 3rd year vocational students at the Vocational Certificate level (Vocational Certificate), and for the 2nd year vocational students at the Higher Vocational Certificate level (Vocational Diploma) for these students to have vocational skills and to enhance their employability before these students starting their careers in the manufacturing sectors. Moreover, Thailand has implemented skills development for both formal and informal workers covering all groups in order to produce workers with knowledge and skills that meet the needs of the manufacturing sectors, such as upskilling, reskilling development in accordance with the requirements of positions with courses such as English, IoT applications for work, computer-assisted design, including “Super Worker” development, that integrated with labor linkage to the market comprehensively. All these formulated plans and projects are focused on increasing the potential of the manpower to support Thailand 4.0.

5. Issue on reform of mechanism to support sustainable utilization and conservation of biodiversity, MHESI is pushing the Growth Engine for bio-economy and circular economy as one of the drivers of the country's economy. There is a proposal on Bio-Circular-Green Economy (BCG) In Action: The New Sustainable. As for the green economy, the proposal focuses on development in 4 areas: (1) agriculture and food; (2) health and medicine; (3) energy, material, bio-chemistry; and (4) tourism and creative economy. Under this project, the National Policy Committee has appointed the BCG Economic Development Agency, and MHESI has established the BCG Sectoral Strategic Project Management Unit in 8 branches (agriculture, food, medical and health, energy, materials and biochemistry, tourism services and creative economy, circular economy, and digital platforms) and propose 10-year implementation plans for all eight branches. In addition, implementing activities have been carried out to establish mechanisms and guidelines to link biodiversity benefitting feeding back to conservation.

6. Issue on reform of the country's overall education and learning system, under the Amended National Education Act and its by-law, the Office of the Education Council has prepared and proposed the draft National Education Act for the consideration of the Council of Ministers at the meeting on March 19, 2019 and the draft of the National Education Act has been approved. The new National Education Act will bring about the National Education Reform Law, which is the master law for the administration and management of education in accordance with the provisions of the Constitution of the Kingdom of Thailand and the guidelines for the administration and management of education in the future. It is linked to the law relating to the establishment of MHESI, which has been approved by the National Assembly.

7. Issue on reform of mechanisms for production, screening, and development of in-service-teachers and lecturer systems, at present, there are still problems related to mechanisms and systems for producing, screening, and developing in-service teachers and lecturers in terms of quantity and quality. There are systemic problems ranging from management and supervision, screening of individuals for teacher education, standards of production and quality development of the teacher process. There are prevalent problems with the screening of qualified individuals into the teaching profession. In terms of quantity, non-quality courses are opened, many institutions admit students without an effective selection process based on the education reform policies wishing to attract talented and decent individuals into the teaching profession. As a consequence, there should be special attention to teacher training institutions by focusing on adjusting the curriculum and teacher production process to suit modern society and there should be continuous development of in-service teachers to have skills in using learning management curriculum, measurement and evaluation of learning outcome, applying media to assist teaching and learning, as well as developing competency-based qualifications framework for teaching

profession, and improving promotional process for teaching profession. The results of the competency assessment will be an important part of the promotion and improvement of appropriate remuneration.

8. Issues on teaching and learning management reform in response to changes in the 21st century, in the recent past, relevant government agencies have driven the reform for teaching and learning by giving priority to competency-based curriculum by means of key plans and projects. The implementation includes the study of the core competency framework for students of basic education, as well as the core competency framework for students of lower secondary education. There is also encouragement for schools to develop teaching and learning in accordance with the essential learning skills in the 21st century. It focuses on providing additional education in various areas, such as civic education, democratic governing, Philosophy of Sufficiency Economy, morals, righteousness and environmental awareness.

4.2 National Reform Plan (Revised Version)

On December 3, 2019, the Council of Ministers approved the revision of the National Reform Plan to be in line with the strategy of the Master Plan together with the related Council of Ministers' resolutions. The Council of Ministers has approved the Revised Version of the National Reform Plan at the Meetings on October 19, 2020, November 9, 2020 and December 8, 2020, respectively. The Revised Version of the National Reform Plan is developed to propose the attainment of the goals of the National Strategy, as well as the National Strategy under the Master Plan, in which all agencies must carry out national reform activities that will result in Big Rock changes for the people leading to the implementation of Casual Relationship: XYZ model to achieve the goals of the National Strategy for each period of the five-year plan. The Revised Version will be carried out in parallel with the original National Reform Plan promulgated in April 2018, which is a regular mission of relevant agencies. The 13 areas of the National Reform Plan are in line with the National Strategy as follows:

1. The national's political reform plan has the objectives to create knowledge and understanding among the people about the democratic regime of government with the King as Head of State. Encourage the people's participation in politics and the public policy processes. Politics is stable and secure and the harmony of the people in the nation is achieved, as well as for political parties and politicians to uphold the interests of the nation and the people sternly. This enables people to have accurate knowledge and understanding of the democratic regime of government with the King as Head of State. Leading to good citizenship in a democratic way, and bringing about the national reconciliation truthfully. Founding public policies that genuinely meet the needs of the people, as well as acquiring political representatives who are knowledgeable, competent, honest, ethical and moral.

2. National Reform Plan on public administration has the objective to give importance to preparing to tackle changes in all dimensions and to cope with the impact of the situation. The new way of living and the formulated strategic direction will result in transparency of public sectors and public trust in integrity and high-quality working standards at the international level. The continuous development and focus on achieving clear results will result in a change focusing on creating unity of power to drive the process of national reform for the public administration system. As a consequence, public services and facilitating people are efficient and effective, which is of significant benefit to the public.

3. National Reform Plan on legal affairs has the objective to achieve the desirable effect of having good laws and only to the extent necessary in accordance with the principles of Article 258 Kor of the Constitution of the Kingdom of Thailand. It is beneficial to reduce the burden of livelihood or occupation for people and businesses as a whole, as well as encourage people to participate in the preparation and proposing of draft laws together with people can access the law and understand its contents easily.

4. National Reform Plan on the justice process aims to facilitate justice in each step to be transparent and completed in a timely manner. People have easy access to justice. Create equality and reduce inequality. To develop an effective justice administration system without any discrimination. People are informed clearly on the implementation period in all stages of the justice process. There are measures to protect the rights and freedoms of the victims, the accused, and the defendant. This enables access to the justice system to be efficient, quick, and convenient, as well as reducing inequality in access to the right to provisional release.

5. National Reform Plan on economics has the objectives of enhancing the country's economic potential; distributing distribution; and strengthening social sectors. The implementation includes the adjustment of roles, structure, and mechanisms of the country's economic management institutions in accordance with the concept of quality management, which plays an important role in driving reform issues to enhance economic competitiveness and reduce inequality to achieve results. As a consequence, manpower in the economic system will have skills in accordance with the needs of the targeted industrial and service sectors, as well as increasing their employability. Moreover, the manpower in agriculture, tourism and small business operators will have higher incomes, which will stimulate the country's economy better.

6. National Reform Plan on natural resources and environment has the objective of ensuring that the natural resources and the environment are maintained, preserved and restored systematically, effectively, and replenished sustainably serving as the foundation for national development. This will support economic, social, and environmental development along with

balancing conservation and utilization. Furthermore, it will help reducing conflicts of development based on natural resources, as well as mitigation of environmental impacts and reduction of natural disasters. More importantly, the implementation will have an effective management system to handle natural resources and the environment based on the participation of all sectors.

7. National Reform Plan on public health has the goals to provide patients, people at risk of diseases and the elderly to receive modern, efficient and effective healthcare services, as well as having better access to up-to-date health literacy, so as to be able to protect and to alleviate preventable diseases themselves. The goal is to promote the elderly to be able to take care of their own health and receive quality care and medical care at home and in the community. As a result, people receive effective public health services comprehensively. The government continuously provides quality and higher standards of public health services.

8. National Reform Plan on mass communication and information technology aims to focus on balancing media freedom in performing their tasks based on their responsibilities and the legitimate overseeing authority. The emphasis will be on the ethical use of the digital domain for mass communication by upholding freedom of expression, in conjunction with the concept of people who believe that freedom of communication is freedom of the people in accordance with the democratic principle. The plan is to ensure that the media as a school of society educates people, cultivates national culture, and nurtures positive attitudes, in addition to facilitating the public to have a channel to file complaints arising from the use of online media. In this regard, both the people who are media consumers, and the operators of the media industry will be taken care of and protected according to their rights in conducting communication transactions both domestically and internationally.

9. National Reform Plan on social issues aims to solve problems of poverty and inequality in society, protect vulnerable groups in society, as well as fairness in people's access to resources and funds. The endeavor is to provide income security for people who reach their retirement age, and post-working age. The plan also ensures that all people with disabilities will not have restrictions on access to disability registration. All sectors can access and utilize information in policy formulation and problem-solving that meet the needs of people in each area. Urban communities can manage resources on their own. Farmers and poor people who have been allocated land from the state can use land title documents or land use letters/documents obtained from the state to guarantee access to loans for their livelihoods.

10. National Reform Plan on energy has the objective of making the energy business to have fairer competition under appropriate market mechanisms. Government agencies use

energy responsibly, economically and efficiently, as well as using clean and environmentally friendly energy. In addition, there should be dissemination of information on energy analysis, in supporting the planning and preparation of the country's infrastructure system and support the growth of alternative energy and continuously disseminate accurate knowledge and understanding for the people, which will result in enhancing the country's energy security and sufficient quantity. All citizens have access to and receive quality services at a fair price.

11. National Reform Plan on prevention and combating corruption and misconduct aims to solve the problem of corruption and misconduct; to promote, support and educate the public about corruption and misconduct; and to have measures to control, supervise, and monitor the management of government agencies and the private sector. In particular, the performance of duties with integrity of personnel who exercise good faith discretion under the principle of good governance and good corporate governance truthfully. This includes disclosing government information to the public for access and accountability, and supporting the private sector collective action coalition to combat corruption to eliminate corruption related to dealing with government agencies. As a result, people will receive effective government services, as well as be encouraged, supported, and educated on the dangers of corruption. There should be effective mechanisms to implement and promote public integration and participation to monitor and prevent corruption as an important force in driving the country to achieve the goals of the Master Plan under the National Strategy.

12. National Reform Plan on education aims to improve the quality of education management and to alleviate educational inequalities. Focusing on academic excellence and enhancing the country's competitiveness. To improve the education system to be efficient in using resources, increase agility to accommodate diversity in education management and promote good governance. Under the reform process, education management will incorporate lifelong learning and will not be limited to the delivery of education toward qualifications. Under the national reform activities that will result in significant changes for the people, the 5 activities to be implemented are as follows: (1) creating opportunities and equality in education starting from early childhood education; (2) developing teaching and learning towards competency-based learning in response to changes in the 21st century; (3) building a production system and developing qualified teachers and educational personnel; (4) organizing bilateral vocational education and other systems that emphasize full extent practical training leading to employment and creating of jobs; and (5) reforming of the research role and good governance system of higher education institutions to support the development of Thailand and to escape the middle-income trap sustainably. Therefore, the implementation will provide people and learners of all age groups with the ability to receive quality education on par with international standards. They will have the necessary skills

for the future world, and they will be able to solve problems, adapt, communicate and collaborate with others effectively. Moreover, they will have better discipline, learning habits continuously throughout life, as well as become citizens who know their rights and duties, having responsibility and public mind as an important force in driving the country to achieve the next national strategic goals.

13. National Reform Plan on culture, sports, labor and human resource development is aimed at instilling morality and ethics in people, increasing the value of the cultural-based economy, and people exercise and play sports regularly. People are also well-versed in health issues to develop their good health and they will serve the development of national sports. The country's manpower has skills that contribute to labor productivity and good quality of life. This will result in the people's development in all dimensions to be good, skilled, and quality people with physical, mental, intellectual, and well-being.

5. (Draft) The Thirteenth National Economic and Social Development Plan (2023 - 2027)

The 13th National Economic and Social Development Plan (2023 - 2027) has embraced the philosophy of Sufficiency Economy as a guiding principle to drive and plan the country's development towards achieving tangible goals in various dimensions under the National Strategy. It aims to be an instrument to identify issues with high priorities for the five-year implementation of the country's development. It is also formulated to gear the country in overcoming challenges to move towards growth that all sectors benefit equally. The implementation places importance on the sustainable development goals to enhance the quality of life of all groups of people and to pass on natural resources and a good environment to future generations. Its goals also include the transformation of Thailand or a sea change Thailand’s Transformation under the concept of "Resilience" to reduce vulnerability, to foster readiness to respond to changes, to be able to adapt to survive in times of crises by building both short-term and long-term immunity so that the country can grow sustainably. The key goal of transformation is directed to modify the country towards a "Hi-Value and Sustainable Thailand" economy. Therefore, the development targets have been identified by assessing opportunities and risks of the country's development within the framework of the National Strategy. As a consequence, examining global trends and challenges, as well as the situation of the COVID-19 pandemic has been carried out to pinpoint all the 13 development milestones that are divided into 4 development areas as follows:

The 13 development milestones are categorized in 4 development areas as follows:

1 : Targeted manufacturing and service sectors

M 1 Thailand is a leading country in high-value agricultural and processed agricultural products

Goal 1: Higher value added of agricultural and processed agricultural products.

Goal 2: Development of infrastructure and management systems for the quality and sustainability of the agricultural sector.

Goal 3: Increase the potential and role of agricultural enterprises as economic partners of supply chains that receive an appropriate and fair share of benefits.

M 2 Thailand is a sustainable quality – oriented tourist destination

Goal 1: Thai tourism is high-quality tourism linked to other potential industries and services.

Goal 2: Restructuring tourism to be dependent on domestic tourism to distribute more economic opportunities.

Goal 3: Thai tourism to have sustainable management system in all dimensions.

M 3 Thailand is the world's major electric vehicle manufacturing base

Goal 1: Creating demand for various types of electric vehicles for domestic use and export.

Goal 2: Existing entrepreneurs can adapt to electric vehicle production and invest in significant EV technology domestically.

Goal 3: Creating readiness of supporting factors systematically.

M 4 Thailand is a high-value medical and wellness center

Goal 1: Thailand has the potential to create economic value from health products and services.

Goal 2: Body of knowledge in medical science and public health has the potential to create added value in health products and services.

Goal 3: Thai people have fair access to health services.

Goal 4: The health emergency management system is ready to respond to health hazards.

M 5 Thailand is the region’s key strategic trade, investment and logistics gateway

Goal 1: Thailand is a gateway for trade and investment in the region.

Goal 2: Thailand is the region's supply chain.

Goal 3: Thailand is the transport and logistics hub of the region.

M 6 Thailand is ASEAN's hub for digital and smart electronics industry

Goal 1: The digital economy within the country is expanding.

Goal 2: Exports of the country's smart electronics industry are increased.

Goal 3: The value of the country's digital and smart electronics industries is expanding.

2 : Socioeconomic opportunity and equality

M 7 Thailand has strong, high – potential and competitive SMEs

Goal 1: Small and medium enterprises have a conducive environment for growth and competitiveness.

Goal 2: Small and medium enterprises have high potential in business operations and are able to elevate and adapt to new competitions.

Goal 3: Small and medium enterprises can have access and obtain effective promotion from the government.

M 8 Thailand has smart cities as well as safe and livable regions with sustainable growth

Goal 1: Economic growth in regions and investment in special economic zones expanded.

Goal 2: Inequality in the income distribution of different regions decreased.

Goal 3: Develop inhabitable cities sustainably and ready to cope and adapt to all forms of change so that all groups of people have a good quality of life thoroughly.

M 9 Thailand has less intergenerational poverty and and adequate, appropriate social protection

Goal 1: Inter-generational poor households have opportunities to advance their socio-economic status and are lifted out of poverty sustainably.

Goal 2: Thai people of all ages are provided with adequate social protection for their livelihoods.

Goal 3: Thailand has sustainable natural resources and environment.

3 : Natural resources and environmental sustainability

M 10 Thailand is a circular economy and low – carbon society

Goal 1: Harnessing the circular economy and resources efficiently in creating value and income.

Goal 2: Natural resources are conserved, restored, and utilized sustainably.

Goal 3: Thai society reduces greenhouse gas emissions and pollution.

M 11 Thailand can mitigate the risks and impacts of natural disaster and climate change

Goal 1: Damages and impacts from natural disasters and climate change are reduced.

Goal 2: Risks of natural disasters and climate change are reduced.

Goal 3: Thai society has immunity from natural disasters and climate change.

Goal 4: Have measures that drive the national transformation dimension.

4 : Key enablers for Thailand’s transformation

M 12 Thailand has high – capability workforce committed to lifelong learning and responsive to future development context

Goal 1: Thai people are developing to their full potential at all ages. They have essential competencies necessary for the modern world living, and are characterized by good social norms. They are moral, ethical, and immune to sudden changes in the world and can live together in society peacefully.

Goal 2: Manpower has high performance in line with the needs of the targeted manufacturing sectors and is able to create jobs in the future.

Goal 3: All groups of people have access to lifelong learning.

M 13 Thailand has a modern, efficient and responsive public sector

Goal 1: Government services are of good quality and accessible.

Goal 2: High-performance and agile government sector.

Key issues in high-performance manpower development according to goals of M 12

In the past, Thailand's manpower development has faced structural changes, including an aging society, development of innovation and global online knowledge resources at low cost and low prices. The life cycle of knowledge has been shortened, especially in digital and fast-changing technologies. The development has been aggravated by the changing trend of demand for learning based on individual interests, as well as the private sector starting to prioritize competency-based recruitment and employment determined by competency rather than educational qualifications. The situation is heightened by the pandemic of emerging diseases that affect people's livelihood and behavior. Therefore, we must accelerate the expansion and reinforcement of development issues towards the transformation of high-performance manpower with high leadership so as to be able to create change and increase the country's capacity.

The goals of M 12, Thailand has high-performance manpower that is committed to continuous learning and responded to development questions of the future by directing to achieve the main goals of the 13th National Economic and Social Development Plan in terms of human resource development for the new era. The implementation aims to develop people of all age groups to have competencies in accordance with the needs of the targeted manufacturing sectors, as well as to create jobs and produce intelligent entrepreneurs who are able to invent and utilize technology and innovation. The objectives are also to move towards a society of opportunity and fairness by promoting lifelong learning. This includes developing an ecosystem for lifelong learning and developing options to access learning for those who cannot afford to study in the regular education system.

Goal 1: Thai people are developed to their full potential at all ages. They will have essential competencies necessary for the modern world, are characterized by good social norms. They are moral, ethical, and immune to sudden changes in the world and can live together in society peacefully with the following indicators.

Indicator 1.1: The Child Development Index increased to 88 percent at the end of the plan.

Indicator 1.2: The percentage of students who do not meet the basic performance level in all three subjects in each school group will be decreased 8 percent at the end of the plan.

Indicator 1.3: The life capital of Thai children and youth increased by 3 percent at the end of the plan.

Indicator 1.4: The number of students participating in educational management programs to develop competency-based graduates increased to 30 percent.

Indicator 1.5: Labor productivity is not lower than 4 percent per year.

Indicator 1.6: The number of elderly people with multidimensional poverty decreased by 20 percent of the number of elderly people with poverty per year.

Goal 2: Manpower has high performance in line with the needs of the targeted manufacturing sectors and is able to create jobs in the future.

Indicator 2.1: World Economic Forum's Competitiveness Index on 6 skills increased by 20 percent at the end of the plan.

Indicator 2.2: World Talent Ranking - IMD Business School's score increased by 3 percent per year.

Indicator 2.3: The number and value of startups are increasing.

Goal 3: All groups of people have access to lifelong learning.

Indicator 3.1: The assessment of the international competency of adults of Thai people in all aspects is not lower than the average of the countries being assessed.

Indicator 3.2: Population aged 15 – 24 years who do not study, do not work or do not join any training, not exceeding 5 percent at the end of the plan.

6. Government policies related to higher education development and manpower production and development

Gen. Prayut Chan-o-cha, the Prime Minister, declared the Council of Ministers' policy statements to Parliament on Thursday, July 25, 2019, comprising 12 key policies and 12 urgent policy issues. When examining detailed of the policy statements in relation to the development of higher education and the country's manpower production and development, there are 4 development issues together with guidelines for higher education that must be driven, it is summarized as follows:

Development Issue 1: Preparing and developing Thai people for the 21st century

Implementation Guidelines

1.1 Promote the right mindset by instilling discipline and ideology of the nation, morality, ethics, public mind, respect for laws and rules of society into all subjects and activities, as well as creating peaceful and safe livelihood for the community level to be freed from narcotics.

1.2 Build knowledge and understanding of the culture, customs and traditions of neighboring countries. It supports the learning of foreign languages together with the promotion and creation of art and culture to be more universal in making Thailand an integral part of the global community.

1.3 Development of next generation of higher education (new breed of graduates) by adjusting the teaching and learning style to develop essential skills namely: knowledge skills; occupational skills; and life skills before starting careers for people of all ages in the 21st century. This includes work-integrated education, adjusting the recruitment system of the teaching profession such as the attraction of appropriate persons, selection process, production and development of teachers, developing English and third language skills, and making short-term training courses.

1.4 Development of lifelong learning and support learning of aging society by means of digital systems for open online teaching and learning.

Development Issue 2: Building higher education role on the global platform

Implementation Guideline

2.1 To enhance Thailand's role in the region and the world platform through advancing the Sustainable Development Goals of the United Nations framework and playing a leading role in ASEAN by strengthening ASEAN solidarity. The implementation should include promoting cooperation frameworks that lead to the pursuit of trade and investment opportunities, as well as acquiring knowledge and innovation with potential countries in different regions of the world.

Development Issue 3: Enhancing Thailand's competitiveness

Implementation Guidelines

3.1 Production and development of researchers, body of knowledge, research results, technology, innovation, infrastructure, environment, and ecosystem that are conducive to the promotion of science, technology, research and development, and innovation to increase the country's technological and innovation potential.

3.2 Development and promotion of operators to drive economic foundation of the country by laying the foundation of the country's economic system for the future by expanding the target industries under the BCG concept. In addition, mechanisms to support the capacity development of small and medium-sized enterprises should be created in order to build up capacities and skills of the community enterprises to be able to handle modern business management, creation of innovation, and the ability to apply digital technology more effectively.

3.3 Production and development of manpower to meet the needs of the country's target industrial sectors.

Development Issue 4: Reforming higher education mechanism

Implementation Guidelines

4.1 Establishing a system that facilitates the development of skills and increases the efficiencies of all age groups, such as improving the quality of higher education standards to be linked to the professional qualifications system by developing measurement and evaluation systems to equate knowledge and experience of learning units. Moreover, career paths should be developed to encourage youth with athletic potential to develop into professional athletes. There should also be a system that can support the needs for occupational skills development of all age groups and studying procedures leading to the development of a credit bank system.

4.2 Focusing special attention on reducing educational inequalities for children with abilities but lacking financial resources, together with measures to solve the problems of educational loan debt by restructuring the student loan fund debt and reviewing application process for student loans for more appropriate education. Moreover, harnessing the higher education body of knowledge to take part in managing mentoring support system to uplift the quality of education.

4.3 Investing in internet gateway network and wireless communication technology in 5G system to support economic competitiveness. Higher education should also support social policies such as educational and public health services, as well as create career development opportunities for people.

4.4 Developing modern government management structures and systems that are suitable for new organizations with flexibility and agility. The implementation includes staff allocation, capacity development of government officials, digitization of the approval process, development of online applications for people to access public services, and development of big data systems for public administration in order to disclose information for transparency and create good governance systems, as well as involving citizens in the development of government services and audits.

7. Policy of the Minister of Higher Education, Science, Research and Innovation

1. Driving university projects to district level in order to build the main root of the country, which is an important apparatus functioning in the area and achieving tangible results. It will use the potential of universities (professors/students/bodies of knowledge) and mobilizing science, research and innovation units together with "MHESI front line" to work proactively in the area, to help solving problems in the community, to support the country's development according to driving Thailand together approach, to expand the results from the university project base to sub-districts in 2021. Through this project, sub-districts that are ready will be uplifted to reach a sustainable level. In addition, it will focus on youth participation and proposals as a force for national development through the hackathon mechanism and will push for economic stimulation in communities/areas by the mechanism "University as Marketplace". In this regard, universities and MHESI's units will be an important economic stimulus and will support and provide opportunities for people in the area to be able to earn money.

2. Establishing the Thailand Academy of Social Sciences, Humanities, and Arts called "TASSHA" to drive academic development and conduct research and development of social sciences personnel, which is crucial for the country. TASSHA will work in parallel with the development of science and technology, it will integrate, drive and expand the results of TASSHA for sustainability, and balancing academics with leveraging the body of knowledge by means of interdisciplinary research, that will be in line with the current and future changes in the world. Initially, it consisted of 5 institutes, namely: Suvarnabhumi Education, Sufficiency Economy, World Studies, National Art Museum, and Thai Artisan.

3. Supporting and driving research that can solve urgent problems and reduce inequalities in society in order to drive targeted research that results in empirical achievement and utilize the body of knowledge from research results and innovation to solve urgent problems.

(3.1) Research and innovation in responding to the COVID-19 pandemic and continue to build national health security. The development will include self-reliance in the production of medicines, vaccines and medical innovations. As a result, there will be a self-sufficient medical and healthcare industry. There are examples of tangible research results in the past, such as vaccines, medical innovation test kits.

(3.2) Research and innovation to meet social challenges such as PM 2.5, drought, coexistence of people of all ages, power from the elderly–turning retirees into power.

(3.3) Research and innovation to enhance competitiveness through the promotion of the Bio-Circular-Green (BCG) Economy by focusing on Thailand's unique services and industries that Thailand has strengths including agriculture and food, health, and medicine.

(3.4) Research and innovation for spatial development and inequality reduction, as well as enhancing self-reliance, converting cultural capital into cultural goods and services to increase potential and develop community economy.

4. Pushing for infrastructure investment to build advanced knowledge, strategic alliances, and laying the foundation for the country. The aims are to promote joint investment in infrastructure, common use of infrastructure, and linking Thailand with international communities through academic cooperation activities of the Center of Excellence in research in various regions of the country, such as the Thai Space Consortium to develop technology in space exploration and astronomy, and the project to build a 3-GeV synchrotron light generator, which eventually will promote Thailand as a forefront synchrotron light research center of the world. Other projects include an innovative food city; higher education, science, research and innovation information archive; and a regional science park.

5. Transforming the Thai higher education system and providing incentives to support human resource development at all levels and systems to drive and unlock limitations and promote a lifelong learning ecosystem.

(5.1) Reinventing the Thai higher education system by pushing universities to develop academic excellence according to their expertise by focusing on the strength of each university group through 5 mechanisms that consist of: improving the quality of teaching and learning; human resource development and acquisition of personnel; internationalization; research and innovation management; and collaborative networking to ensure that university has clear mission and can carry out the intended results.

(5.2) Creating incentives and support for personnel development at all levels and systems. By pushing the new academic tenure system such as, Practitioner Professor, Research Professor, and Teaching Professor. There will be an allocation of funds for personnel and career path development. Encouraging the public sector and society to play an important role in the development of higher education and encourage people to serve as research citizens, and integrating scholarships/research grants to be in line with the national strategy. Support and expand educational opportunities for disadvantaged groups such as students in the southern border provinces, marginalized provinces, and students with disabilities.

(5.3) Developing teaching and learning personnel, especially the training and development of teachers for all levels of education including vocational teachers, and supporting the preparation of youth, such as the establishment of demonstration schools of vocational education, etc.

(5.4) Developing manpower of all ages through the modern and quality higher education system. Developing learning styles that are suitable for all groups of people, as well as providing development of youth and students to be forces of the nation. Enhancing skills to create opportunities for people to have careers and income. Creating readiness for manpower to enter the labor market in line with the needs of the country. By developing blended education during the COVID-19 crisis by providing non-degree upskill and reskill courses to develop skills and prepare people to meet the needs of the industry, agriculture and services.

(5.5) Inspiring youth, students and the public to have access to learning resources in science and technology, social sciences, humanities, and fine arts thoroughly. Encouraging communities and citizens to participate in local information education and inspiring them to adapt the learning to the context of each area and culture to benefit the development of the country as a whole.

(5.6) Enhancing Thailand's role in the international platform, in particular, the CLMV countries including higher education, science, research and innovation. The collaborative efforts will eventually contribute to the tangible development of the region, as well as strengthen relations with foreign countries, especially the People's Republic of China, Japan, South Korea, India, the United States and European countries.

8. Policy Framework and Strategy for Higher Education, Science, Research and Innovation for 2023 – 2027

The Policy Framework and Strategy for Higher Education, Science, Research and Innovation for 2023-2027, or MHESI's Policy and Strategic Framework, serves as a framework for the country's development to be carried out by MHESI. It provides guidelines for higher education institutions and research institutes to coordinate, activate, and mobilize resources in implementing activities to be consistent with MHESI's Policy and Strategic Framework. The framework provides emphasis on the focus of the policy, and serves as guidance for the modification of higher education plans for the production and development of the country's manpower for 2021 – 2027 and revised 2023 – 2027. The framework is formulated to develop Thai higher education, and the preparation of the Science, Research and Innovation Plan 2023 – 2027 to develop science, research and innovation of the country, including driving on key issues. At the Meeting of the National Higher Education, Science, Research and Innovation Policy Council on July 19, 2021, a resolution was passed approving the principles of the MHESI's Policy and Strategic Framework for 2023 – 2027.

Key issues of MHESI's Policy and Strategic Framework for 2023 - 2027 have been formulated in congruence with the country's development direction after the COVID-19 crisis by adopting the principle of guiding direction of the country's development with the measure "Take a Giant Step/Great Leap Forward" for the country. There are pinpoint flags providing direction and clear goals, challenging and achievable with tangible results in the given time frame. It also focuses on creating inspiration, as well as forming leverage, marginalizing science, and system-based transformations. Moreover, it emphasizes creating exemplified excellence in some significant subjects at the regional and global level, but not in all subjects. MHESI's Framework will emphasize harnessing of higher education, science, research and innovation as development tools, by taking advantage of existing infrastructure, improving and further developing to meet international standards. The development will concentrate on taking a parallel approach to enhance competitiveness and self-reliance sustainably at the national level while integrating higher education, science, research and innovation in the implementation of cross-disciplinary and cross-ministerial manner.

Formulation of the MHESI's Vision on **"The Combined Power of Higher Education, Science, Research and Innovation to Transform the Country Development Speedily and Sustainably in Order to Enhance the National Competitiveness by Means of Creative Economy to Add Commercial Value and Great Leap Forward for the Future".**

The driving force for MHESI's Policy and Strategic Framework for 2023-2027 is formulated into 4 strategies and 6 high-priority policies as follows:

• **Strategy 1:** Developing the Thai economy through value creation and creative economy to be competitive and sustainable self-reliant, ready for the future.

• **Strategy 2:** Enhancing society and environment for sustainable development that can solve problems, challenge and adapt to the changing dynamics of the world.

• **Strategy 3:** Developing cutting-edge science, technology, research and innovation to create new opportunities and enhance readiness for the country's future.

• **Strategy 4:** Developing manpower, higher education institutions and research institutes to be the base for driving the country's economic and social development in leaps and bounds and sustainably.

High-Priority Policy 1:	High-value medical and health hub
High-Priority Policy 2:	Tourism Destinations
High-Priority Policy 3:	Leading countries in agricultural products, processed agriculture, useful and high-value foods
High-Priority Policy 4:	The elderly have full potential and opportunity to become self-reliance
High-Priority Policy 5:	Advanced and cutting-edge technology and innovation in the future and space technology
High-Priority Policy 6:	High-performance manpower and the high-level manpower hub of ASEAN

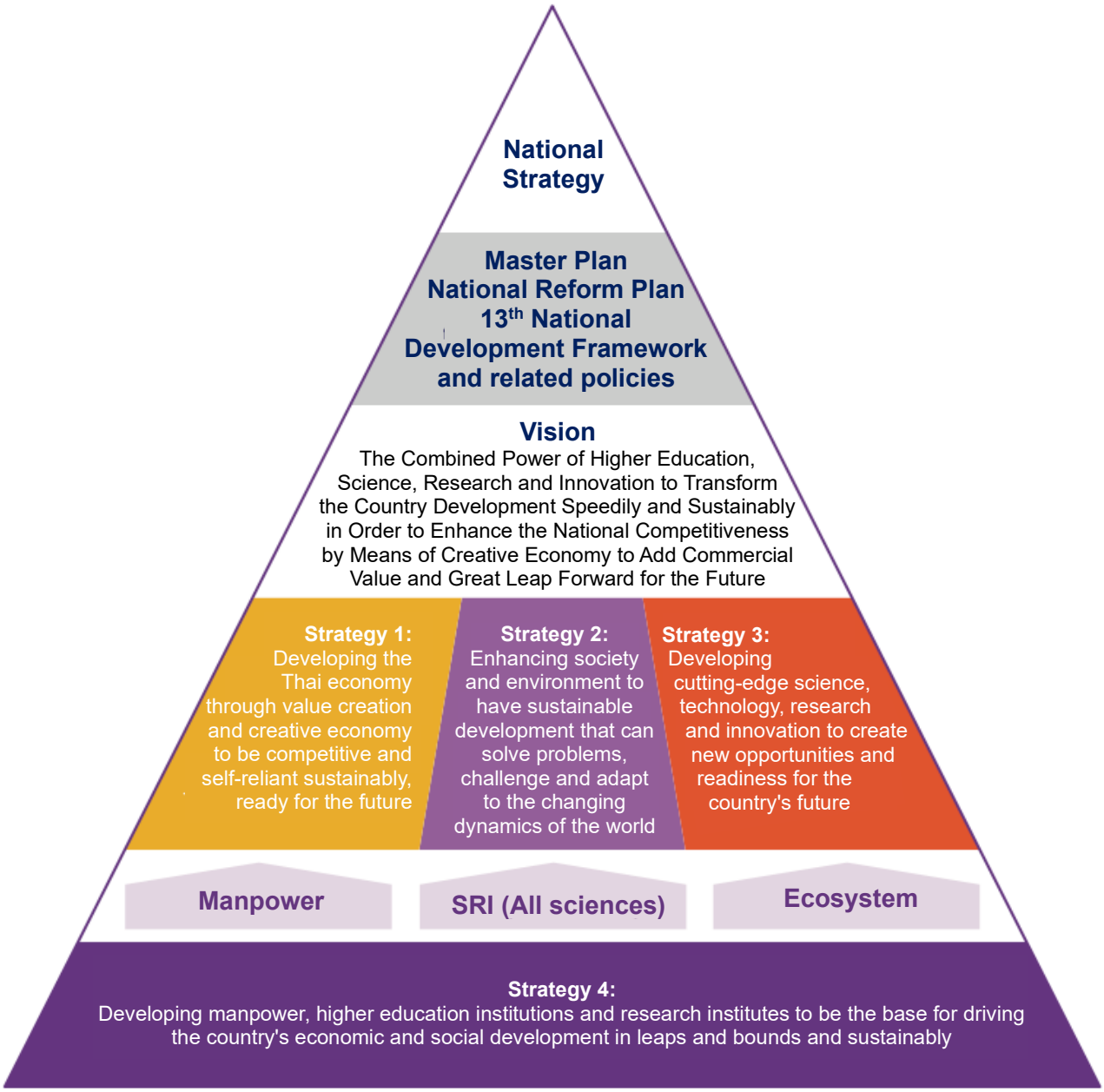


Figure 6 Vision, Objectives and Strategy for Higher Education, Science, Research and Innovation

Source: Revised version of MHESI's Policy and Strategic Framework for 2023 - 2027 proposed to the Policy Council in July 2021

1.3 Higher education statistics

The management of Thai higher education follows the international model, which was first established in 1916. The total period to the present day is 105 years. There has been a continuous evolution of higher education management since the big Education Reform in 1999 until the establishment of the Ministry of Higher Education, Science, Research and Innovation (MHESI) in 2019 by transferring higher education institutions under the Office of the Higher Education Commission to be under MHESI. Its mission focuses on producing high-performance manpower at bachelor's, master's, and doctoral levels, as well as advancing research further to turn into innovation in order to strengthen the country's development in both social and economic dimensions. Currently, there are a total of 155 public and private higher education institutions, with a total of 1.58 million learners (as of the academic year 2020). The evolution of Thai's higher education institutions can be classified into 4 stages of development with different focuses on manpower production according to the context of national development at that time. Stage 1, there are only a few higher education institutions that focus on producing graduates to meet the demand for high-level manpower in the public sector, to serve mainly in the civil service. Stage 2 is the distribution of educational opportunities to regional areas, resulting in the establishment of higher education institutions in various provinces of the country. Stage 3 is the provision of higher education for the masses, and an open system of higher education institutions has been established in the form of subject markets in response to the demands of increasing numbers of students. Stage 4 is at present, which is the important turning point to utilize the potential of higher education institutions as sources of body of knowledge. This development stage concentrates on producing high-quality manpower, and creating research and innovation to drive the country's development to elevate the country to escape the middle-income trap to a high-income country.

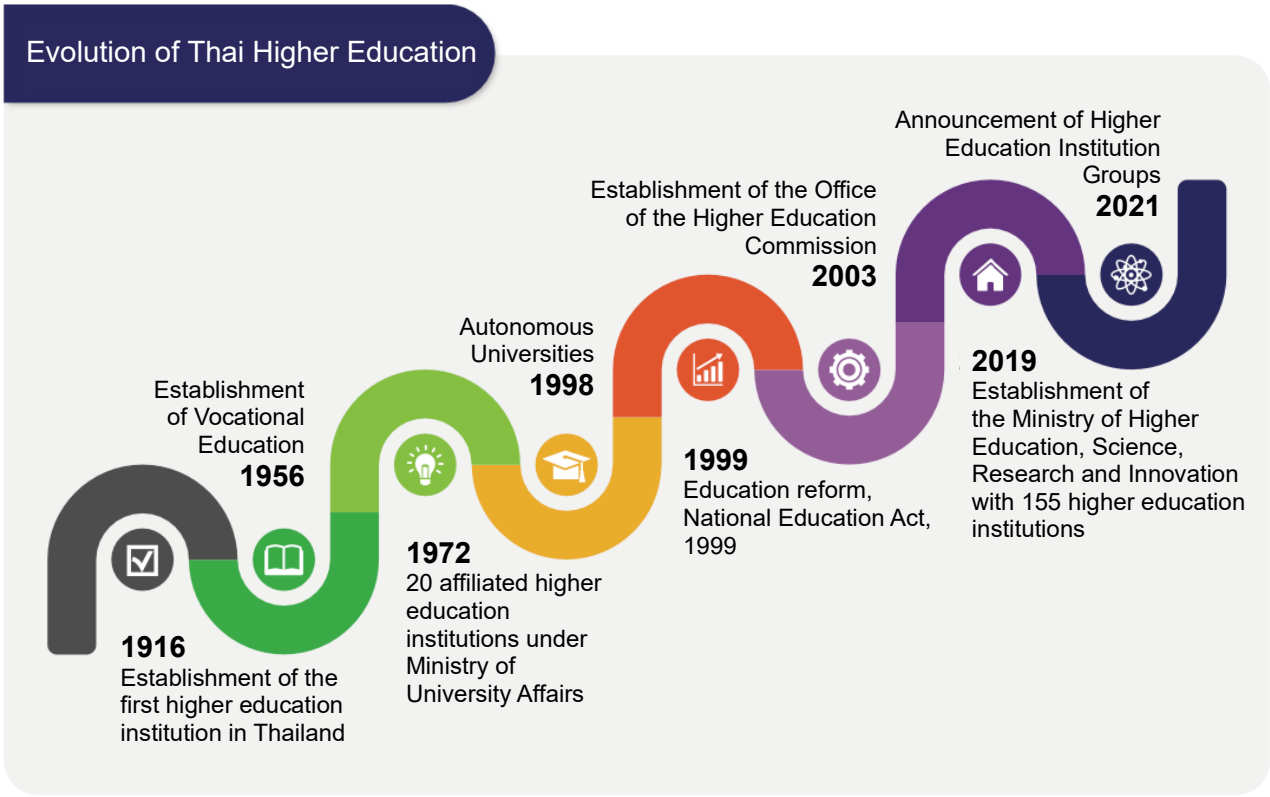
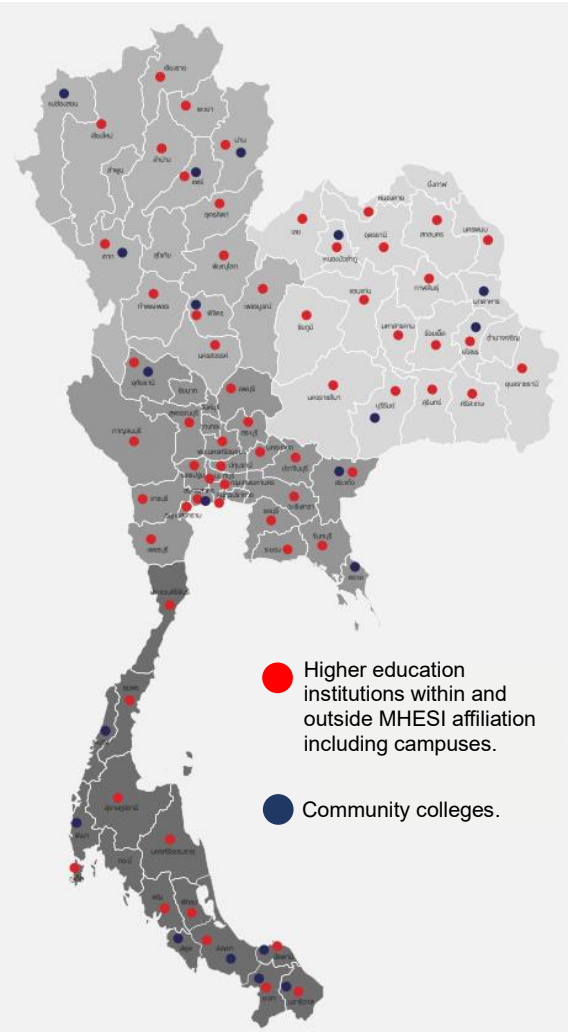


Figure 7 Evolution of Thai higher education

1. Higher education institutions

The distribution of higher education institutions under MHESI and other agencies delivering courses leading to bachelor's degrees or equivalent.



Number of degree-granting institutions in Thailand classified by region (institutions)	172
Central	88
Western	7
Eastern	8
Northeastern	30
Southern	15
Northern	24

Figure 8 Distribution of Higher Education Institutions in Thailand

Currently, there are a total of 155 higher education institutions under the supervision of MHESI divided into 56 public higher education institutions; 26 autonomous higher education institutions; 72 private higher education institutions; and 1 community college institution (20 community colleges in 20 provinces that have the status equivalent to a department or 1 higher education institution). In this regard, public higher education institutions can be classified into groups of institutions, as follows: 9 state-affiliated higher education institutions; 38 Rajabhat Universities; and 9 Rajamangala Universities of Technology. In addition, there are 17 higher learning institutions under the jurisdiction of other government agencies including the Ministry of Defense, the Bangkok Metropolitan Administration, the Ministry of Transport, the Ministry of Culture, the Ministry of Public Health, the Ministry of Agriculture and Cooperatives, and the Ministry of Tourism and Sports.

When considering the distribution of location according to regions, higher education institutions (excluding campuses) together with the location of the established community colleges to serve the purpose of increasing opportunity for those who want to pursue higher education in different geographical areas of the country. This makes it possible to see the potential of educational management covering the area and supporting the target learners thoroughly. Meanwhile, the impact of structural change in demography will definitely result in the decreasing number of learners and in the long run, the existence of public and private higher education institutions will depend on adaptability to the direction of the changing context.

2. Number of students in higher education

Figure 9 indicates that the population aged 18 - 22 years is the age group that enrolled in higher education. According to the demographic forecast, this age group is expected to contract due to the changing of the Thai population structure with a declining birth rate and a complete transition to an aging society. Therefore, when comparing the number of undergraduate students in the tertiary education age group (between 18 - 22 years old) with the number of undergraduate and graduate students in higher education institutions under MHESI, both the public and private higher education institutions, from 2012 to 2020, it was found that the number of undergraduate students tends to decline in line with the trend of higher education age population structure. As for the proportion of undergraduate students and the number of graduate students, there has been an inverse change over the course of 9 years, however, the ratio of change is still considered low. When examining the proportion of the tertiary-age population enrollment in undergraduate study during 2016 – 2020, it was found that the enrolment rate continued to decline at an average of 1.19 percent per year.

This reflects factors affecting the number of students in the higher education system, including attitudes and behaviors of the Zoomer generation who have access to digital technology and various learning channels, as well as their particular attention to work, acquiring experiences, and choosing to learn outside the higher education system. Other individuals include those who experience inequality, resulting in dropping out of the education system due to poverty, illness, disability, litigation, or teenage mom. These factors will result in the rise of a group of workforces who do not have skills ready for employment, or a workforce with obsolete skills who do not meet the demand of the labor market (Social Status Report Q1/2020, NESDB).

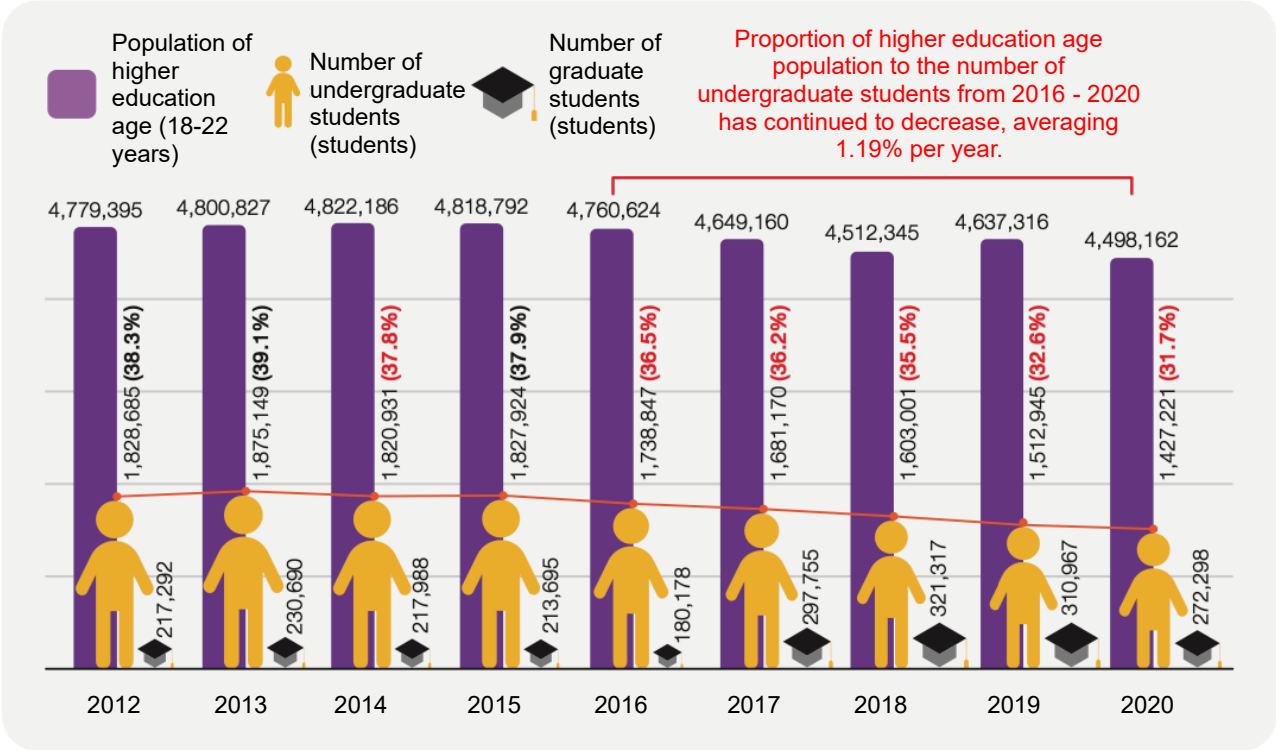
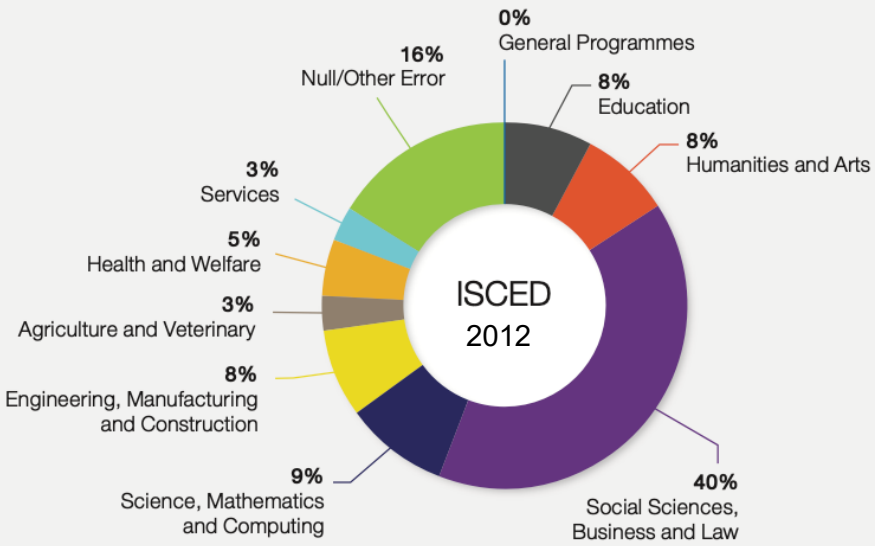


Figure 9 Chart showing the number of undergraduate and graduate students enrolled in higher education institutions under the supervision of MHESI in comparison with the higher education age group (18 - 22 years old) during the academic year 2012 – 2020

Number of undergraduate students *in the academic year 2012*, classified by 9 groups of ISCED, 1,828,685 students



Number of undergraduate students *in the academic year 2020*, classified by 10 groups of ISCED, 1,427,221 students

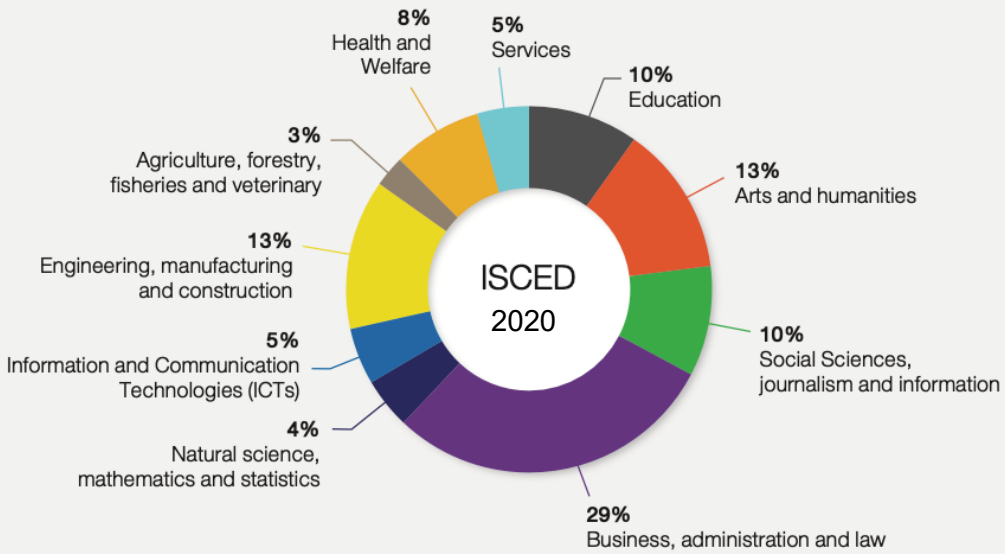


Figure 10 Chart showing the proportion of the number of undergraduate students classified by ISCED in 2012 and 2020 of higher education institutions under MHESI

Figure 10 shows the number of undergraduate students in higher education institutions under MHESI in 2012 compared to 2020, the number of students decreased by 22 percent. When considering the number of students under the ISCED classification during those years, it was found that the most popular field of study remained in the social sciences group. In the academic year 2012, 40 percent, which is the largest proportion of students enrolled in social sciences, business, and law groups. In 2020, enrollment in business administration and law accounted for the largest proportion of 29 percent, while social sciences, journalism and information accounted for 10 percent. When combining the proportions of the two groups, they accounted for 39 percent when compared with the mentioned proportions of 2012. Therefore, it can be concluded that during the nine years of enrolment, the Thai students still concentrated their studies in this group of study programs.

However, when comparing with other study programs, the proportion of study programs that have been expanded in engineering, manufacturing and construction increased by 6 percent; arts and humanities increased by 5 percent; health and welfare increased by 3 percent; education increased by 2 percent; and service increased by 1 percent respectively. While study programs remain unchanged such as agriculture; forestry; fisheries and veterinary science increased by 3 percent, and science, mathematics and computing at 9 percent. In 2020, there was a slight change in the enrolment of two groups of disciplines namely: information and communication technologies (ICTs) increased by 5 percent, and natural sciences, mathematics and statistics increased by 4 percent when compared with the aforementioned groups of disciplines.

It reflects that higher education should focus on pushing the proportion of science and social sciences learners to be in line with national development policies. For example, the BCG model, which is the industries of the future that will create value, includes medicine, logistics, food, aerospace, and sustainable tourism, etc. There is increasing demand for manpower in sciences group, which includes the natural sciences, mathematics and statistics group; agriculture, forestry, fisheries and veterinary group; and ICTs group. However, there are also a growing tendency to congruent with the above context including the following groups such as engineering, manufacturing and construction group; and health and welfare group. Nonetheless, social sciences are still necessary for national development, but as the context of higher education is changing, there will be a decline in some disciplines of sciences that tend to attract a smaller number of learners. Therefore, adaptation to integrated learning should be explored including cross-disciplinary study; modular curriculum following demand-driven results; as well as upskilling, reskilling and new skilling for the in-service workforce in the labor market and the elderly; will enable higher education to produce manpower that is ready for the rapidly changing social trends.

Higher education institutions produce graduates for careers and livelihoods on average over 340,000 people per year. Statistics of all graduates classified by types of higher education institutions

between 2014 – 2019 shown in Figure 11 indicate that the total number of graduates of all types of institutions is likely to expand. As a result of the supervision of the quality of education management, it is a contributing factor that public universities continue to produce the highest proportion of graduates, followed by the Rajabhat Universities, private higher education institutions, Rajamangala University of Technology, public universities (unlimited admission), and Community Colleges respectively. However, during the past six years, it was found that all these higher education institutions continue to have almost the same proportion of graduates for each academic year. This is the result of the Thai government's policy to establish and amalgamate higher education institutions following the guidelines formulated by the Council of Ministers. At the meeting on January 2, 2019, the Council of Ministers approved a resolution to acknowledge in principle the review of the proposal to establish government agencies in accordance with the national reform plan as proposed by the Office of the Public Sector Development Commission (OPDC). OPDC stipulates that before proposing any new agency, government agencies have to follow the Resolution of the Council of Ministers issued on May 1, 2018. The Resolution specified that the proposed agency needs to consider adjusting its role, mission and the existing structure of the proposed agency before proposing the establishment of any new agency. The proposed agency also needs to adjust its administration to come up with tangible implementing methods to integrate with other existing agencies with similar missions. The implementing method of the proposed agency has to take into account the importance, urgency, rationale. Moreover, its appropriateness has to be in line with the current situation and future trends, including budgetary constraints, as well as the government policy frameworks, and policies of relevant ministries. Furthermore, in proposing the establishment of a new agency, the proposal must specify how to dissolve or merge with existing units (One-In, X-Out). The Resolution is formulated in order to prevent redundancy in both mission and budget. The proposal also needs to incorporate the utilization of digital technology into the operation of a proposed new agency. The mentioned Resolution of the Council of Ministers shall apply to the proposal to establish a new agency for all government agencies, public organizations, and all forms of public agencies with different management structures. The said Resolution is also enforced for all the cases implemented under the national reform plan as well. Therefore, the establishment of a new agency under MHESI has to be carried out in accordance with the national reform plan and in accordance with the Resolution of the Higher Education Commission No. 13/2561. The Resolution stipulates that proposals to restructure higher education institutions or consideration of management division in public higher education institutions shall be based on the principles of re-profiling and re-positioning of Thai higher education institutions' capacity-building strategies as operational guidelines to consider restructuring, disbanding, merging or organizing the entire system of higher education institutions in line with the national strategy, including the implementation of the Reinventing University Project in accordance with the Ministerial Regulation on Grouping of Higher Education Institutions B.E. 2564 (2021).

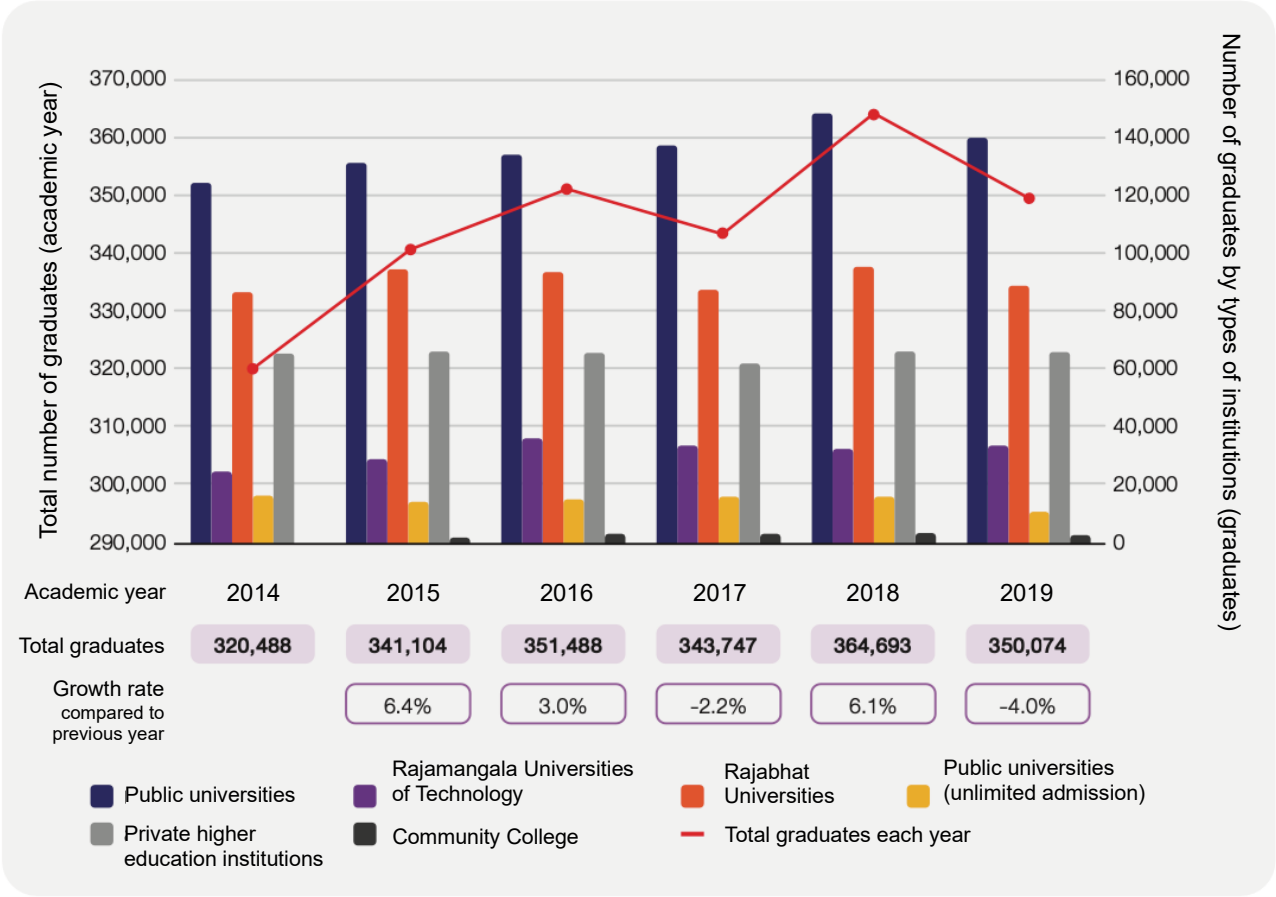


Figure 11 Chart showing total number of graduates classified by type of higher education institutions during 2014 – 2019

During 2014 - 2019, the proportion of number of graduates arranged under the ISCED classification according to the groups of study programs namely: social sciences; science and technology; and health sciences accounted for 68:25:7 respectively. The largest group with the highest proportion of graduates was in the study programs of business administration and law. The smallest group with the lowest proportion of graduates was in the study programs of agriculture, forestry, fisheries, and veterinary science as shown in Figure 12.

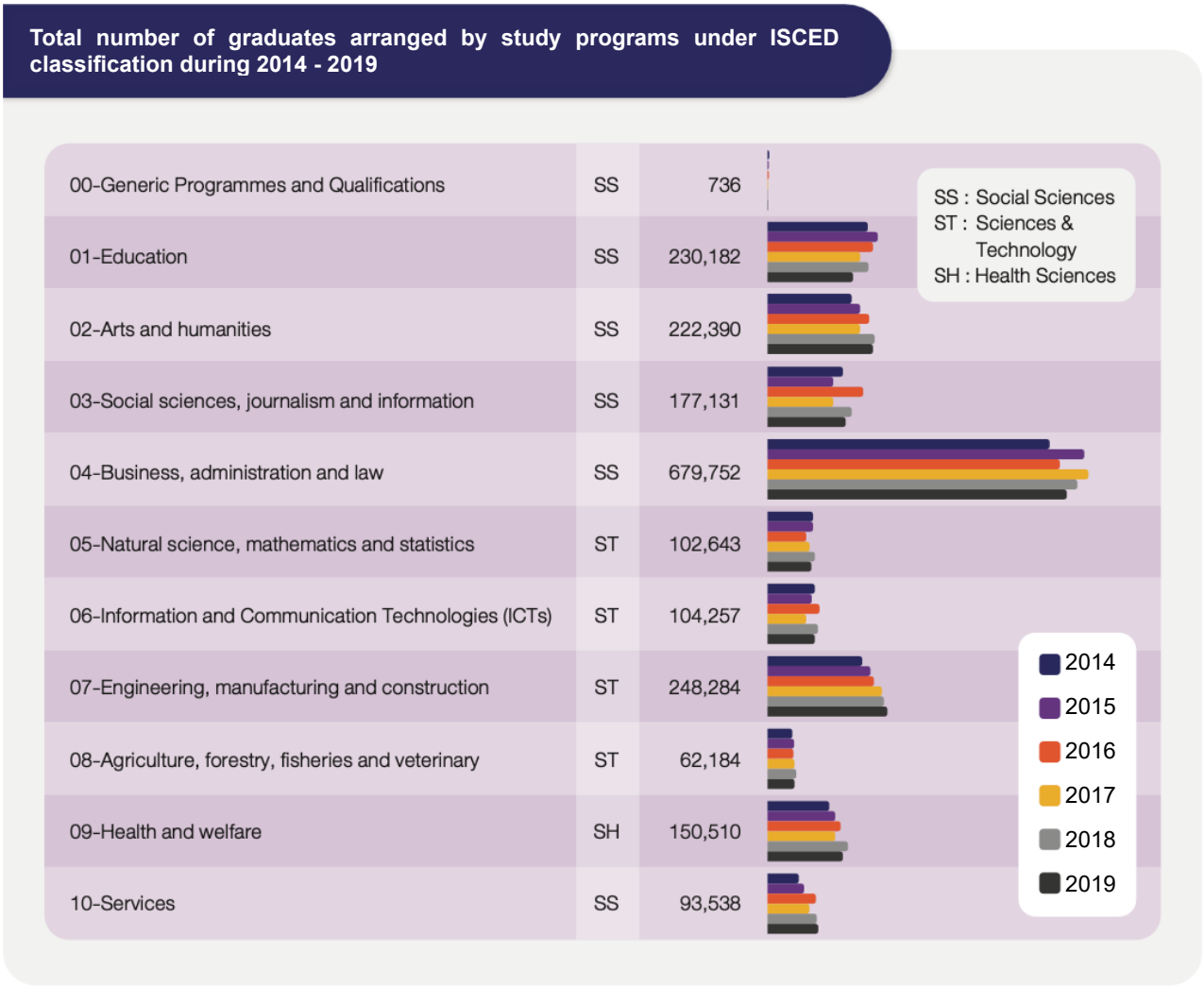


Figure 12 Chart showing the total number of graduates arranged by study programs under ISCED classification during 2014 - 2019

When considering the number of students in the higher education system in the academic year 2020, classified into 10 groups of target industries (S-Curve), it was found that there was a total of 459,235 students in 10 groups of S-Curve groups, accounting for 29 percent of the total number of students in the academic year 2020, which totaled 1,608,099 students. When compared to 114,500 graduates in the S-Curve groups in the academic year 2019, or 33 percent of the total 350,074 graduates in the academic year 2020. The figure shows that the proportion of students and graduates in the digital industry and comprehensive medical industry is higher than other industrial groups.

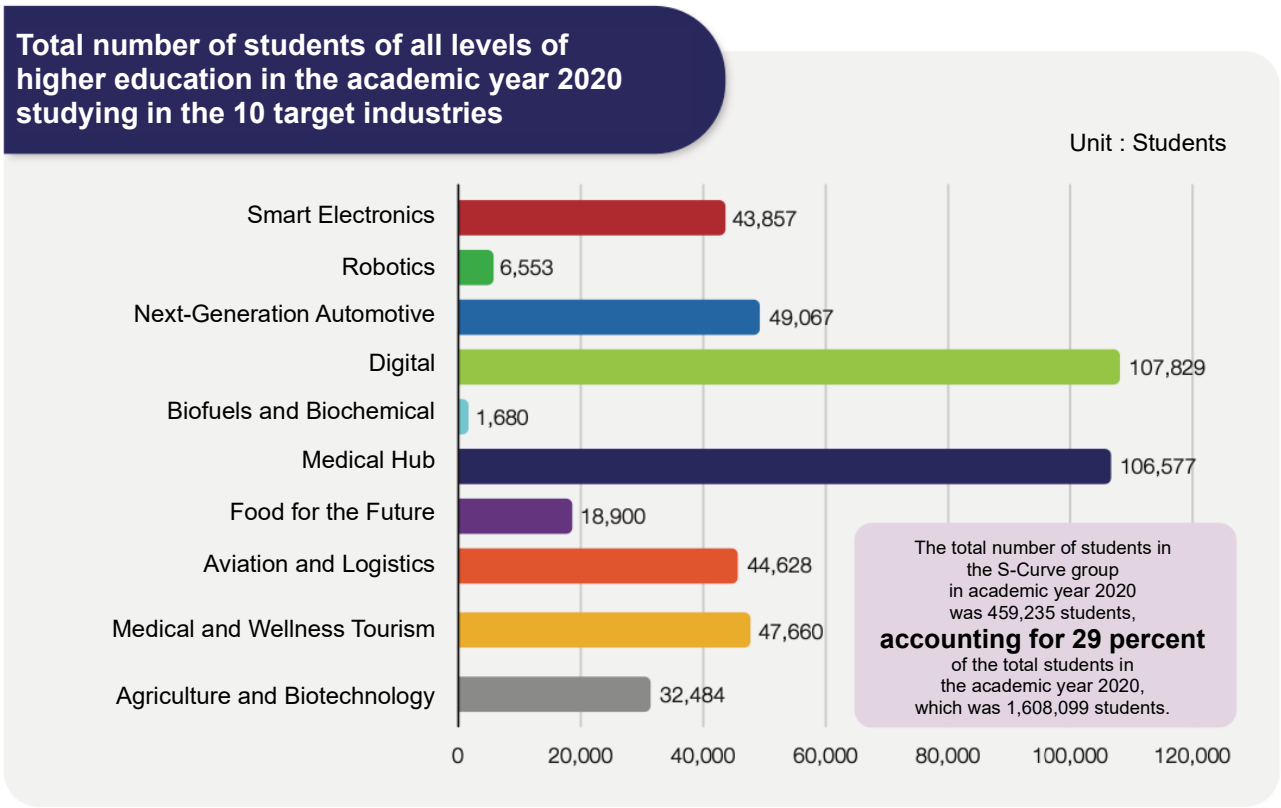


Figure 13 Total number of students of all levels of higher education in the academic year 2020 studying in the 10 target industries

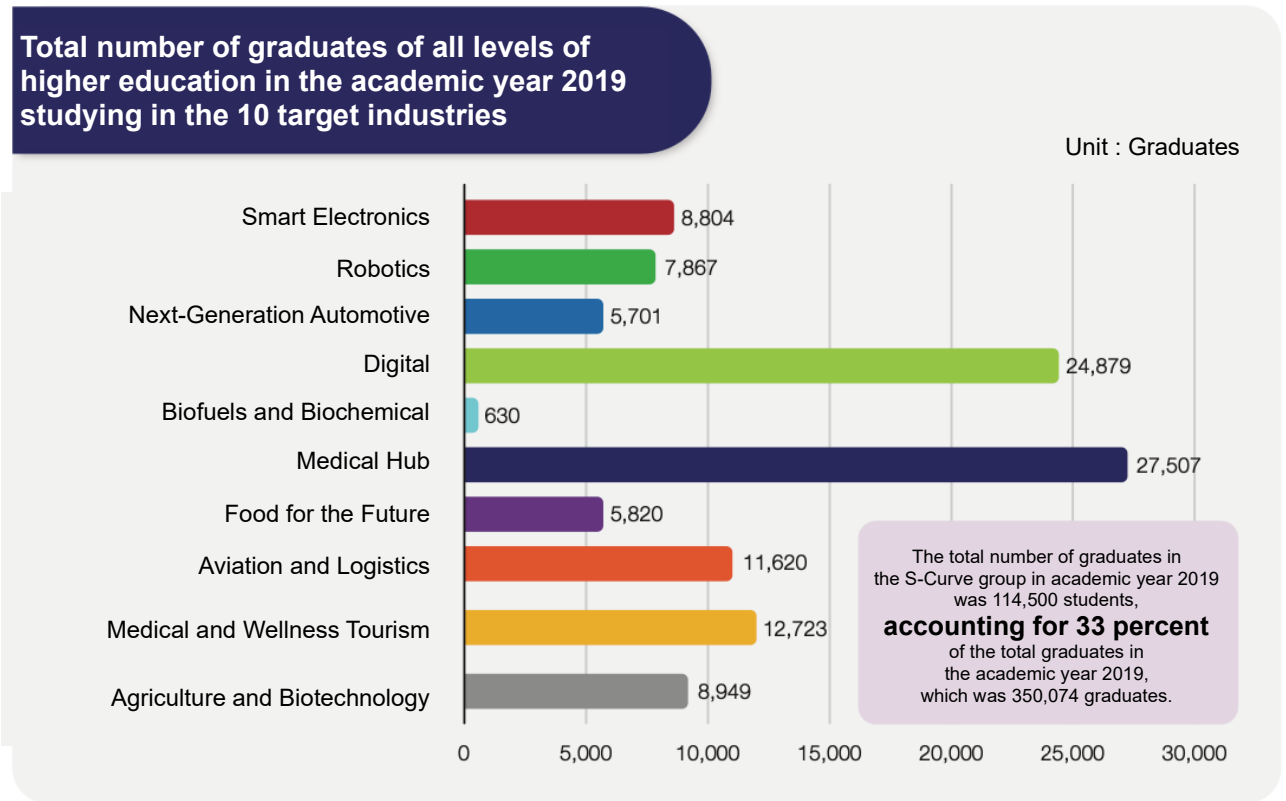


Figure 14 Total number of graduates of all levels of higher education in the academic year 2019 studying in 10 target industries

However, the production of graduates by higher education institutions will reflect the outcome as graduates enter the labor market. According to the data of the graduates during the academic year 2017 - 2020 who entered the labor market, it was found that graduates during those four years who were employed accounted for 66.78 percent, 64.80 percent, 61.91 percent, and 67.87 percent, respectively. Graduates who were unemployed and did not continue their education accounted for 26.60 percent, 29.65 percent, 32.78 percent, and 26.60 percent, respectively. Students who continued to further their studies accounted for 4.83 percent, 4.10 percent, 4.12 percent, and 4.36 percent, respectively. Whereas graduates who continued their education while working accounted for 1.78 percent, 1.45 percent, 1.19 percent, and 1.17 percent, respectively.

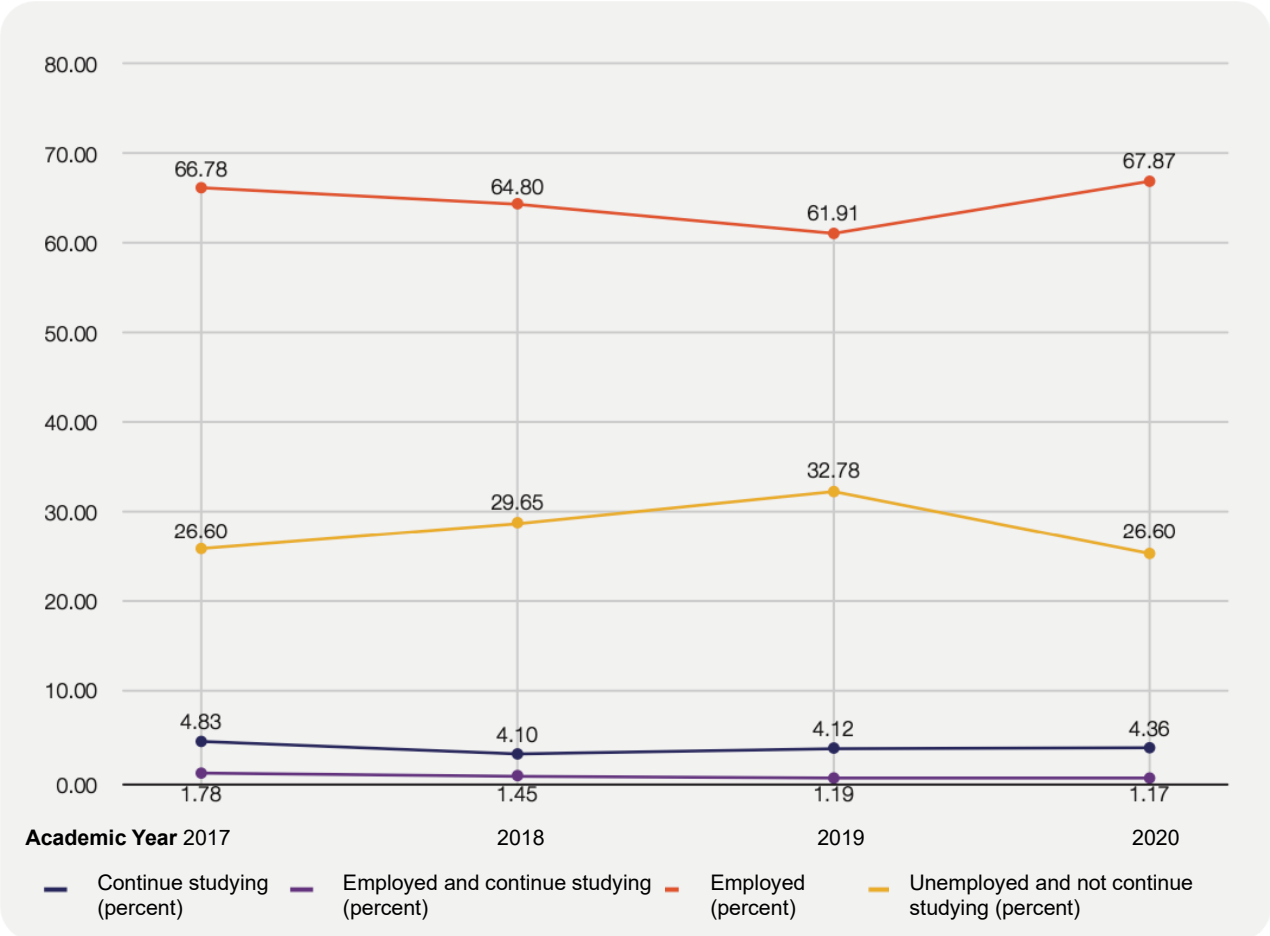


Figure 15 Graduates classified by status of their employment during the year 2017 - 2020

3. Higher education institutions personnel

Public and private higher education institutions personnel under the supervision of MHESI during the academic year 2012 - 2020 illustrated in Figure 16 shows the total number of approximately 200,000 personnel. The ratio of academic personnel to supportive staff is between 40:60. However, since 2015 the proportion of academic personnel has been increasing continuously.

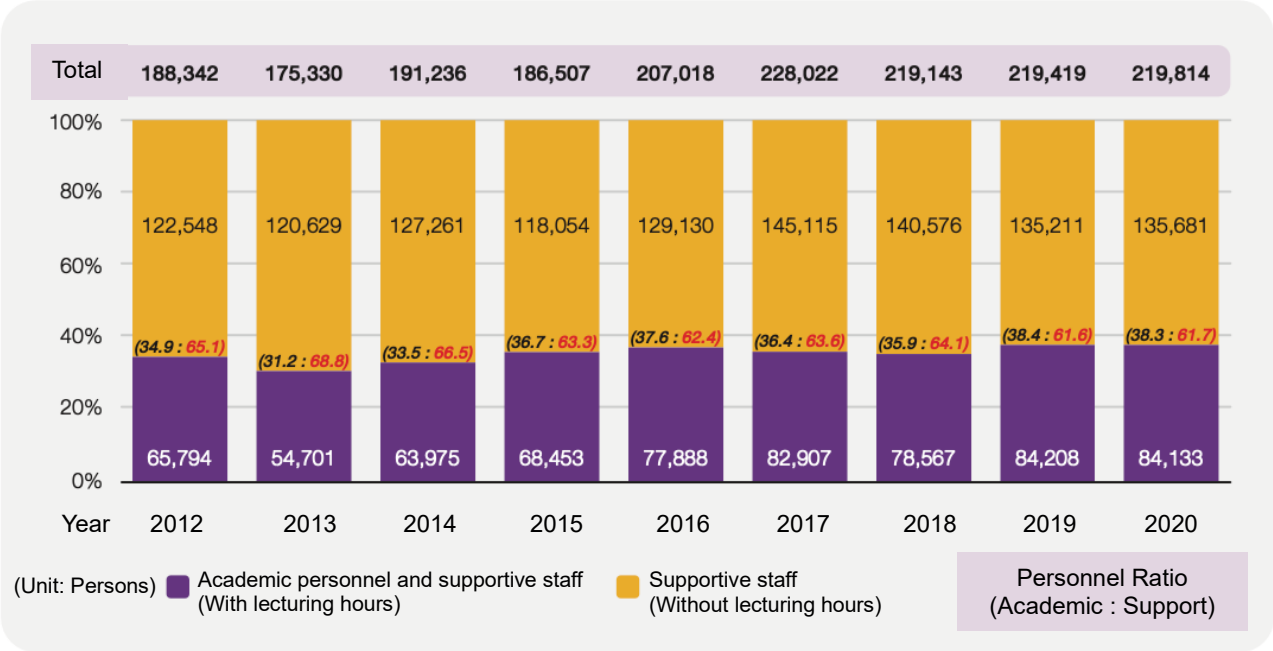


Figure 16 Number of personnel in public and private higher education institutions under MHESI, academic year 2012 - 2020

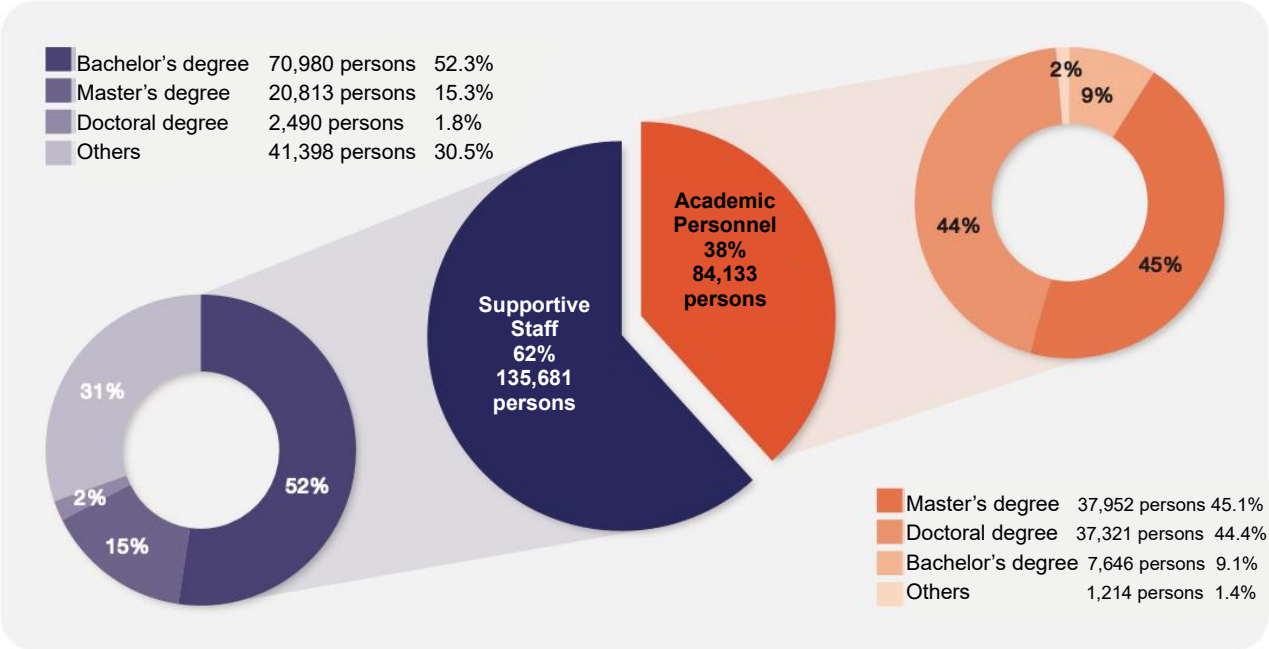


Figure 17 Number of academic personnel in higher education institutions classified by their qualifications in academic year 2020

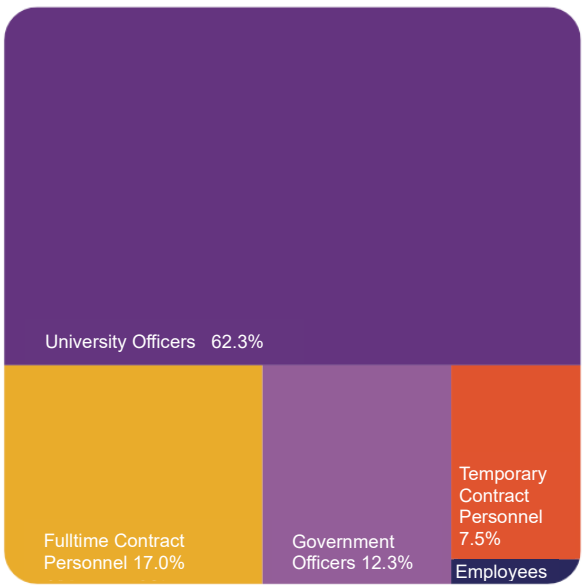


Figure 18 Proportion of academic personnel in academic year 2020 classified by types of personnel

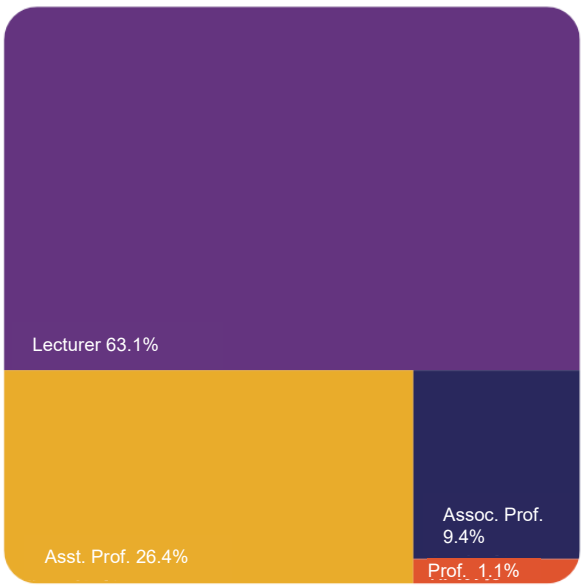


Figure 19 Proportion of academic personnel in academic year 2020 classified by academic tenure

In the academic year 2020, there were a total of 219,814 personnel, the ratio between academic personnel to supportive staff was accounted for 38:62. In view of the fact that the potentiality of academic personnel has a direct result in managing teaching and learning, and the quality of graduates. In this regard, 84,133 academic personnel, accounted for 38 percent of higher education institutions personnel were examined. Figure 17 shows that these academic personnel with doctoral degree qualifications accounted for 44.4 percent, master's degrees accounted for 45.1 percent, bachelor's degrees accounted for 9.1 percent, and others at 1.4 percent. Most of the academic personnel or 62.3 percent, were university employees, 98.9 percent of them worked as full-time lecturers, 87.3 percent of the academic personnel had academic tenure. This includes 1.1 percent with tenure of Professor, 9.4 percent with tenure of Associate Professors, 26.4 percent with tenure of Assistant Professors, and 63.1 percent as lecturer with no academic tenure yet.

The improvement of the quality of personnel in higher education institutions is the duty of higher education institutions to educate faculty members and other personnel to be up-to-date with academic progress in the world. Teaching and learning development, and research need to be up-to-date in line with academic and world changes and social and technological development. Higher education institutions have to promote and support the production of academic works at the national and international levels. Furthermore, higher education personnel need to be promoted and supported to apply knowledge, academic achievements and innovations to create new entrepreneurs for the country as stipulated in the Higher Education Act B.E. 2562 (2019). However, the state should continue to promote and resolve obstacles that hinder the development of personnel potential, as well as to establish mechanisms to support quality operations further.

4. Research drive of Thai higher education institutions

The research potential of higher education institutions is to harness the capacities of science and technology to push the country's policies to enhance economic competitiveness and to create a quality society according to the 20-Year National Strategy. When examining the Scopus database which is an internationally renowned database by means of the SciVal program, in 2016 - 2020 showed an increase in Thailand's international publications, especially among 55 higher education institutions, which accounted for 91.8 percent of the total number of publications, followed by 14 government agencies and research institutes, which accounted for 7.8 percent, and three private organizations accounted for 0.4 percent. In this regard, it can be concluded that higher education institutions are the significant key drivers of research in Thailand. It is apparent that international research publications have continually increased trends from 2016, totaling 16,529 topics to 24,874 topics in 2020, or an increase of 50.5 percent. Please see the details in Figure 20.

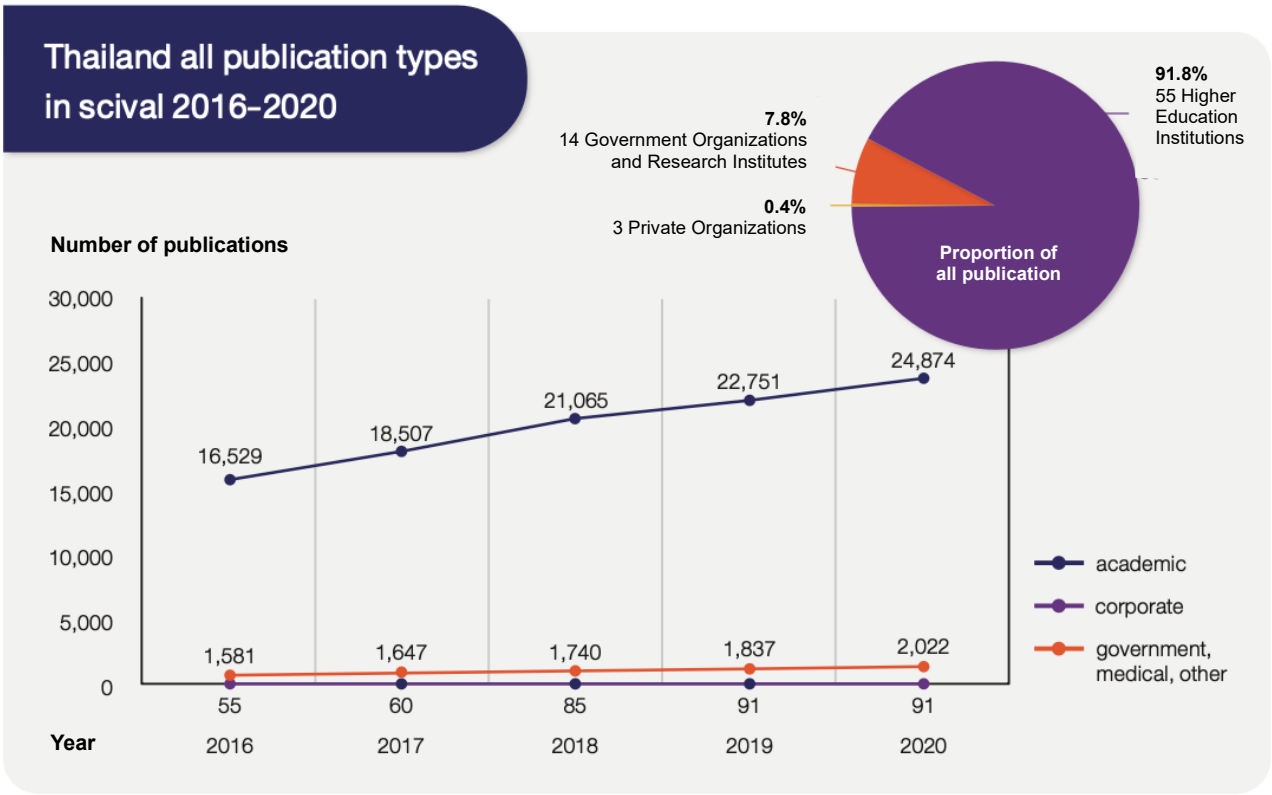


Figure 20 Thailand all publication types academic year 2016 – 2020

In terms of the Citation Index, which is an indicator of the quality of academic performance, it was found that autonomous higher education institutions are among the top institutions with the highest number of citations, with the top 5 being Mahidol University, Chulalongkorn University, Chiang Mai University, Khon Kaen University, and Kasetsart University (Figure 21). Therefore, the Citation index and the International Patent (Figure 22) are important elements that contribute to the ranking of universities and the National Competitiveness Rankings of the International Institute for Management (IMD), as well as the World Economic Forum (WEF) rankings.

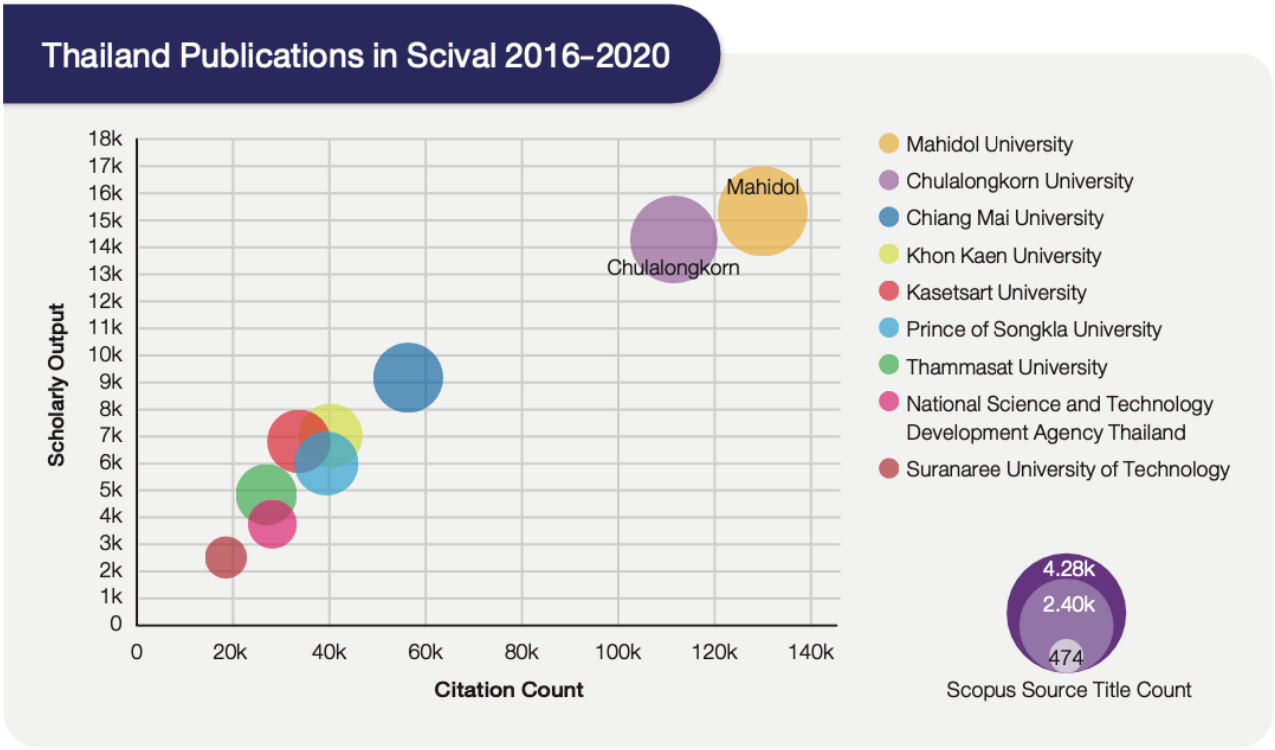
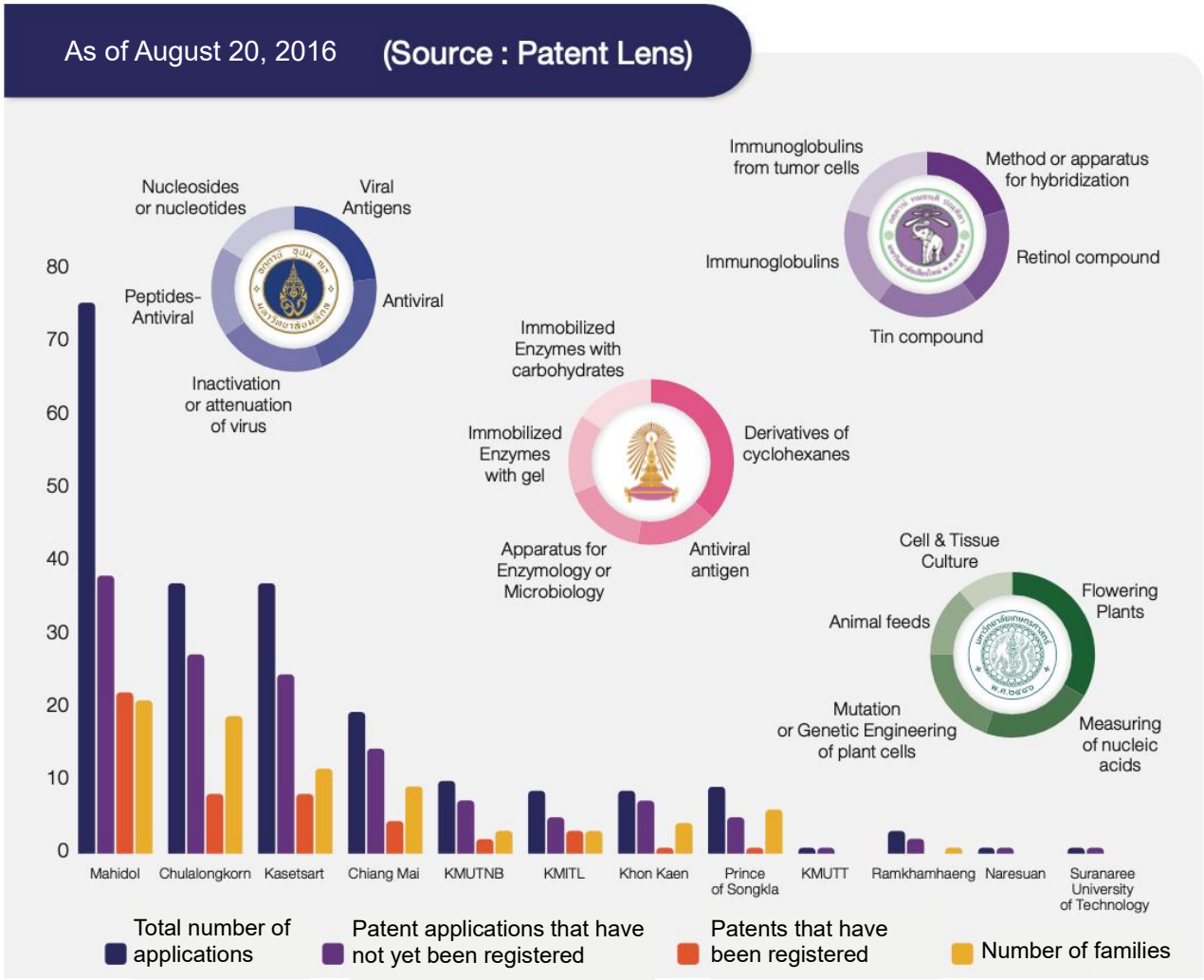


Figure 21 Data on international publications in Thailand from SciVal, 2016 – 2020



Applicants	MU	CU	KU	CMU	KMUTNB	KMITL	KKU	PSU	KMUTT	RU	NU	SUT
Total number of applications	75	37	37	19	10	8	8	9	1	3	1	1
Patent applications that have not yet been registered	38	27	24	14	7	5	7	5	1	2	1	1
Patent that have been registered	22	8	8	4	2	3	1	1	0	0	0	0
Number of families	21	18	12	9	3	3	4	6	0	1	0	0

Figure 22 Details of patent applications, number of registered patents and variety of patent types applied for (data from Patent Lens International Database, January 2017)

5. Thai higher education institutions on the world stage

Changes in the global context from globalization have resulted in the rapid transmission of data and information worldwide. This creates perception and comparison in terms of quality, without exception of higher education institutions, that reflects the potential of higher education institutions and the country's development capacity. Looking at the global rankings of higher education institutions from both **THE World University Ranking** and **QS World University Rankings**, some Thai higher education institutions are ranked and recognized on the world stage.

The Times Higher Education World University Ranking 2020-2021
Thailand University

Rank	Thailand University	Overall	Teaching	Research	Citations	Incom from Industry	International Outlooks
601-800	Chulalongkorn University	30.2-36.3	34.4	22	29.3	60.2	40.3
601-800	Mae Fah Luang University	30.2-36.3	16.8	9.9	60.4	33.4	52.7
601-800	Mahidol University	30.2-36.3	33.9	22.3	42.8	71.4	45.5
801-1000	King Mongkut's University of Technology Thonburi	25.1-30.1	18.8	17.5	35	72.3	34.5
1001+	Burapha University	10.3-25.0	21.2	7.9	8.9	33.4	27.5
1001+	Chiang Mai University	10.3-25.0	22.4	15.6	19.9	44.6	32.9
1001+	Kasetsart University	10.3-25.0	19.3	13.1	12.7	49.3	34.7
1001+	Khon Kaen University	10.3-25.0	22.8	13.3	18.4	56	30.3
1001+	King Mongkut's Institute of Technology Ladkrabang	10.3-25.0	18.1	21.6	6.2	84.7	20.2
1001+	King Mongkut's University of Technology North Bangkok	10.3-25.0	15.9	10.3	17	38.8	21.3
1001+	Mahasarakham University	10.3-25.0	17.9	7.9	9.6	34.5	26.9
1001+	Naresuan University	10.3-25.0	18	8.2	14.1	42.8	35.9
1001+	Prince of Songkla University	10.3-25.0	17.9	11.2	18.8	37.8	31.5
1001+	Silpakorn University	10.3-25.0	17	9.2	12.3	41.3	24.9
1001+	Srinakharinwirot University	10.3-25.0	18.1	8.5	9.7	33.6	19.3
1001+	Suranaree University of Technology	10.3-25.0	19.3	13.2	22.1	50.2	31.4
1001+	Thammasat University	10.3-25.0	20.4	13.3	11.2	39	34.4

Figure 23 Ranking of Thai higher education institutions in THE World University Ranking 2020 - 2021

According to **THE World University Ranking 2020 - 2021**, 17 Thai higher education institutions were ranked and 4 higher education institutions were ranked below 1,000, namely: Chulalongkorn University; Mae Fah Luang University; Mahidol University; and King Mongkut's University of Technology Thonburi respectively (Figure 23). The total score is from the index of teaching and research. Research citations and international recognition continued to rise from 2018 to 2020 (Figure 24).

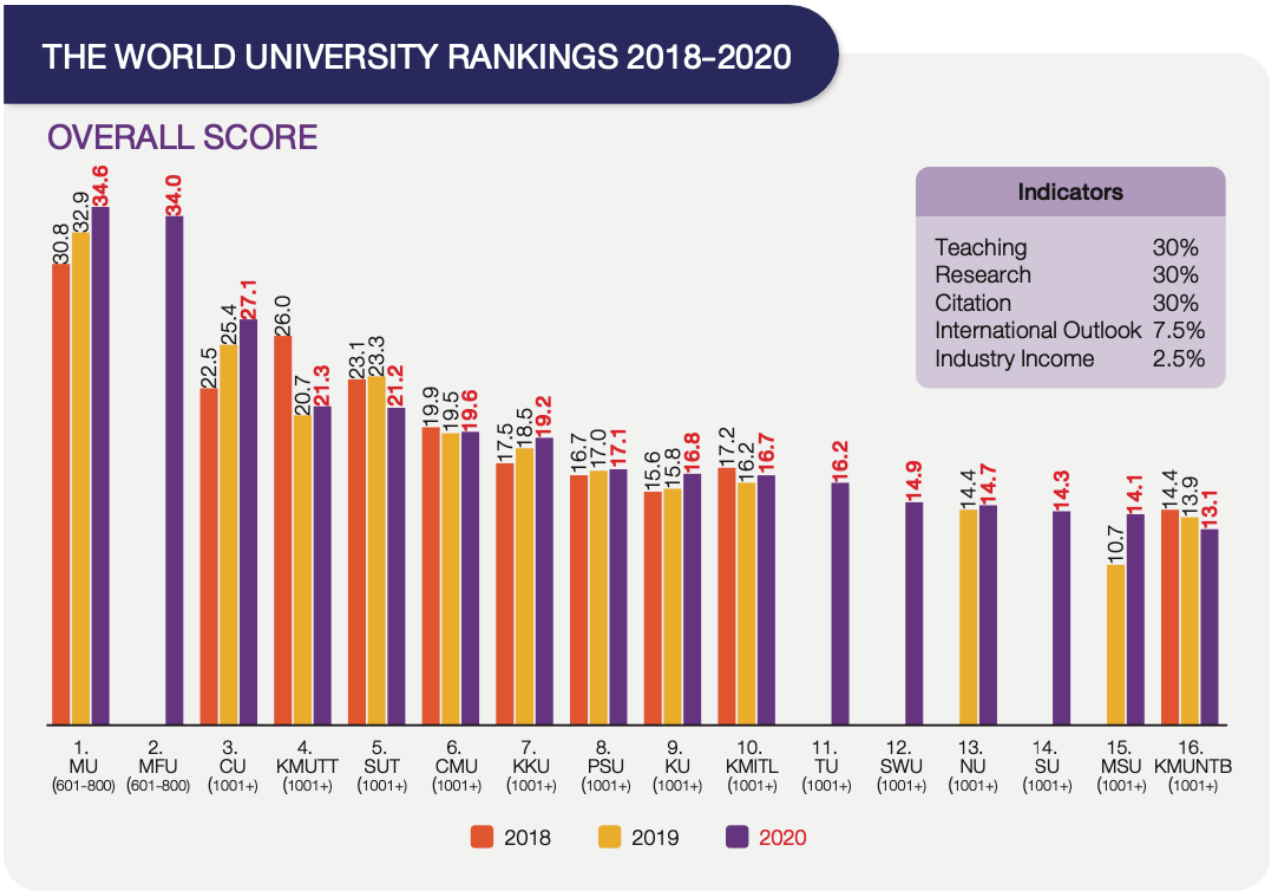
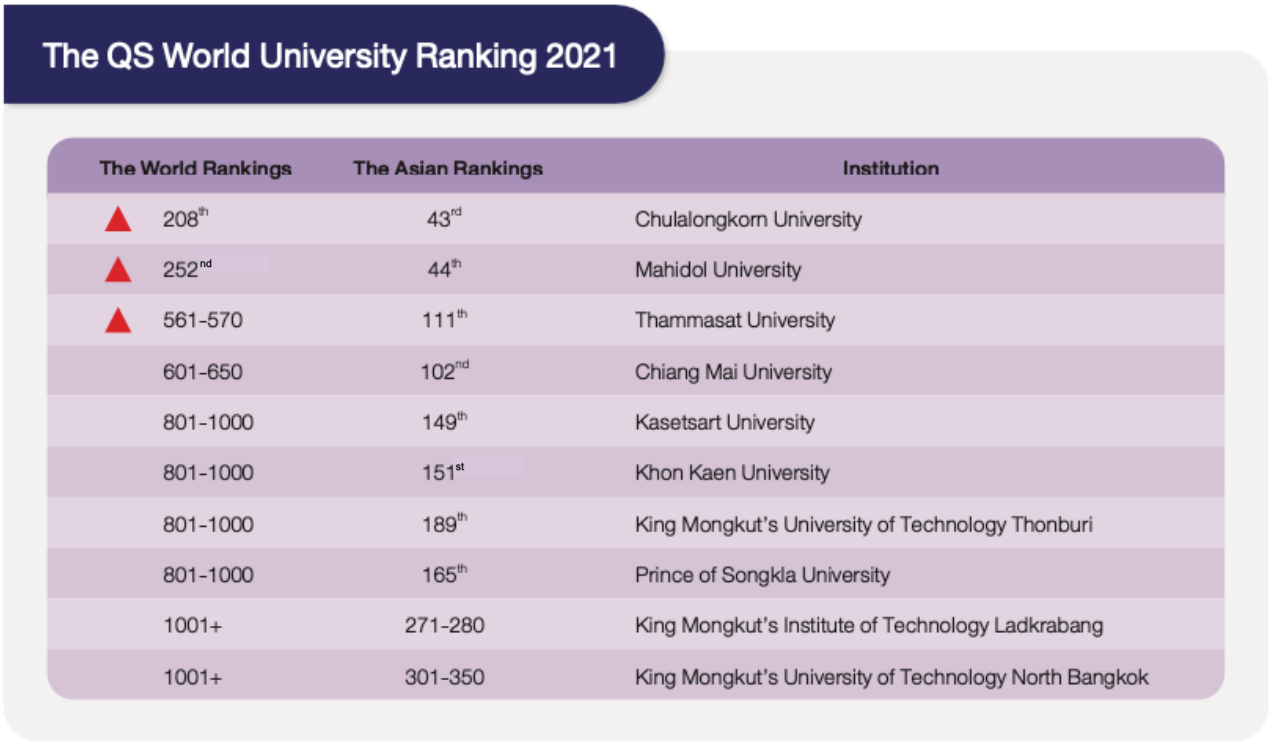


Figure 24 Total score of Thai higher education institutions in THE World University Ranking 2018-2020

According to the **QS World University Rankings 2021**, there were ten Thai higher education institutions ranked below 1,000 (Figure 25), two of the Thai higher education institutions were included, ranked between the range of 200 and 300. While there were three Thai higher education institutions were ranked higher than the previous year. When looking at all these ten institutions, it was found that they were the group of higher education institutions with academic works published internationally.



The World Rankings	The Asian Rankings	Institution
▲ 208th	43rd	Chulalongkorn University
▲ 252nd	44th	Mahidol University
▲ 561-570	111th	Thammasat University
601-650	102nd	Chiang Mai University
801-1000	149th	Kasetsart University
801-1000	151st	Khon Kaen University
801-1000	189th	King Mongkut's University of Technology Thonburi
801-1000	165th	Prince of Songkla University
1001+	271-280	King Mongkut's Institute of Technology Ladkrabang
1001+	301-350	King Mongkut's University of Technology North Bangkok

Figure 25 Ranking of Thai higher education institutions in the QS World University Ranking 2021

As a consequence, to enhance the competitiveness of the country, as well as that of higher education institutions to be recognized on the academic platform both regionally and globally, it is necessary to create quality academic works and body of knowledge. It can be used for reference, to apply for a patent until full-grown innovation, and to create value-added finally. One of the important factors is the development of research personnel and lecturers in higher education institutions to be able to develop quality academic work and gain more recognition. It is also necessary to adjust the proportion of academic personnel to support lines in higher education institutions to be more appropriate, which will result in a higher ratio of research to personnel in higher education institutions. Higher education institutions need to build collaborative networks through higher education institutions and research institutes both domestically and internationally so as to be a mechanism to drive higher education institutions towards better rankings with full efficiency.

1.4 Report on implementation results of Milestone Phase 1 in 2021 for the Higher Education Plan for Thailand's Manpower Production and Development for 2021 – 2027

The Higher Education Plan for Thailand's Manpower Production and Development for 2021 - 2027 has formulated 3 strategies for the development of Thai higher education during the 7 years period as follows: Strategy 1: Human capacity building; 2: Research ecosystem strengthening; Strategy 3: Higher education transforming. It is intended that higher education will uplift the potential of Thai people, create intelligence for the sustainable development of Thai society. The plan has set up 3 main goals, namely: Goal 1: Enhancing quality and quantity of manpower to support the national's development and changes according to global trends; Goal 2: Developing research to create body of knowledge and innovation for sustainable national development; and Goal 3: Higher education institutions have competencies that meet their uniqueness and strengths to achieve quality of the higher education system and to determine the outcomes and impacts for the three phases of the Milestones, namely: Milestone I 2021, Milestone II 2022, and Milestone III during the five-year period 2023 – 2027, which must be reviewed and updated to be in line with the 13th National Economic and Social Development Plan (2023 - 2027).

In 2021, higher education has driven various missions under the volatile environment affected by external factors. The external ramifications have a direct effect on the teaching and learning management, as well as research and development of higher education institutions. As a consequence, it has jeopardized the driving of networks and building knowledge and understanding of the development goals under the joint plan carried out by the central internal unit within MHESI.

The report on implementation results consists of the following three parts.

Part 1: Achievements of policy, standards management mechanisms

The implementation includes pushing the tools that are the mechanism for change and leverage under the strategy of the Higher Education Plan to achieve results in the first phase (Milestone I) that have continual ramifications on other strategies of the next phases (Milestone II – III).

1) Driving higher education institutions to meet their uniqueness and strengths by announcing the Ministerial Regulation on Grouping of Higher Education Institutions B.E. 2564 (2021), requiring all or part of higher education institutions to be organized into groups by taking into account the goals, mission, strategy, potential, and past performances of higher education institutions. The grouping of higher education institutions also coordinates other mechanisms for adjusting the higher education system, such as determining the quality of teaching and learning standards based on institutional grouping. Moreover, the budget allocation focuses on achievements by means of assessing the output and results that the institution delivers to the country, etc. Thai higher education institutions are grouped as follows:

(1) Global and Frontier Research.

(2) Technology and Innovation.

(3) Area - Based and Community.

(4) Moral and Intellectual Cultivation.

(5) Development of Professional and Specialists.

(6) Other groups as announced by the Minister.

2) Management mechanism for reforming budget allocation system based on achievement-oriented by preparing fiscal budget on the annual expenditure of higher education institutions in accordance with Section 45(1), 45(2), and 45(3) of the Higher Education Act B.E. 2562 (2019). The new budget allocation will focus on demand-side financing in order to utilize the higher education budget effectively and to be in accordance with the policy, strategy, and plan of higher education development for fiscal year 2021. The Higher Education Commission and the National Higher Education, Science, Research and Innovation Policy Council have endorsed the higher education budget of 10.250 billion baht for the enhancement of academic excellence of higher education institutions and for the production of high-level manpower with specific needs of the country, and the Council of Ministers at its meeting on January 14, 2020, has approved the proposed budget. As a consequence, in 2022, the two mentioned committees have approved a budget framework for higher education to produce graduates and manpower in the form of degree and non-degree short-term courses to meet the needs of the country. This allows opportunities for non-school learners to develop their existing knowledge and skills by means of reskilling, upskilling, and new skilling. The project aims to promote the development of the BCG model under the Eastern Economic Corridor and to support the post-COVID-19 crisis, as well as strengthening the Reinventing University System in Thailand with a budget of 8.80 billion baht. The Council of Ministers approved the proposed budget at its meeting on March 9, 2021. In this regard, the Prime Minister has appointed a committee to review the budget for higher education for that fiscal year to scrutinize the expenditure budget and to recommend the preparation of an action plan, work plans, projects, and budget requests for all higher education institutions under MHESI.

However, despite the Council of Ministers' budget approval, no budget has been allocated yet for the implementation of Section 45(3) of the Higher Education Act 2019.

3) The policy mechanism for the production and development of manpower in accordance with the government policy framework to have the quantity and desirable characteristics which the MHESI's Minister (Adj. Prof. Anek Laothammatas, Ph.D.) has issued the Ministerial Announcement of MHESI on the Philosophy of Thai Higher Education and the New Higher Education System on the Production of Graduates and Development of Manpower on May 27, 2021, as determined by the Higher Education Commission at its meetings No. 3/2021 on March 9, 2021 and No. 4/2021 on April 27, 2021, as follows:

"Thai higher education aims to produce graduates and develop the manpower of all ages by means of lifelong learning. These people should have the following necessary characteristics as being moral, ethical and competent people, who will be able to support the sudden changes in society and disruption of technology both now and in the future. They should also be able to enhance the competitiveness of the country at the international level and be able to uplift the quality of life of the people. At the same time, they love and are proud of the good institutions, cultures and traditions of the nation. In this regard, the production of graduates and the development of manpower must be carried out with close collaboration with various sectors, such as the public and private sectors, civil society and the community."

4) The mechanism of higher education standards is formulated to enhance and supervise the quality and standards of teaching and learning that support lifelong learning by formulating the MHESI's Ministerial Announcement on criteria/guidelines for promoting lifelong learning management for higher education. One of the target groups that lifelong learning will be promoted is the retirement age group, which will have a devised set of necessary skill sets/knowledge sets for that age group. MHESI also encourages higher education institutions to design and develop curricula that are suitable for non-school-age learners, and to enhance competencies and skills for the in-service workforce by means of reskilling, upskilling, and new skilling through the clearinghouse mechanism and credit bank system.

5) Legal mechanisms, rules, regulations and statutes related to the control and the promotion of policy and administration in all aspects of higher education institutions in accordance with good governance principles, consisting of:

The draft MHESI's Ministerial Announcement on Monitoring and Inspection of the Implementation of Higher Education Institutions B.E. … requires higher education institutions to report their performance information through their official website.

The Ministerial Regulations on Higher Education Information B.E. … stipulates a section on requiring higher education institutions to disclose performance information.

The draft framework and guidelines for the development of the higher education information system, which stipulate that the first-year plan must link data with at least 60 higher education institutions and aims to link data with all public and private higher education institutions within 3 years. The implementation is complex in commanding higher education institutions to have similar formats of data.

The draft MHESI's Ministerial Announcement on Guidelines on Good Governance in Higher Education Institutions B.E. ... will facilitate higher education institutions to follow the guidelines on enhancing good governance in higher education institutions and to provide assurances on their operation on legitimacy, building morale and creating a sense of responsibility among higher education institutions staff and personnel, as well as students, and stakeholders in drafting this MHESI's Ministerial Announcement. Consequently, higher education institutions can utilize the guidelines to support their operation fairly, building morale and responsibility among their personnel, students, and relevant parties.

The Draft MHESI's Ministerial Announcement on Guidelines on Social Responsibility, Academic Freedom, Autonomous and Equality B.E. …. is formulated to serve as guidelines for higher education institutions to use as procedures or central standards for internal administration and operations, as well as to define, to amend, to add, and to revise administrative statutes of relevant higher education institutions in the future.

6) Participatory management mechanism through the front-end unit of MHESI in supporting the development of regional provinces to drive Thailand together. According to the MHESI's Minister Order No. 226/2563, dated November 23, 2020, the end unit of MHESI coordinates the work of higher education, science, research and innovation to increase capacity combined with provincial potential by integrating the diverse body of knowledge of higher education institutions and agencies under MHESI. The aim is to bring the potential of provincial communities and localities to combine with research, development and innovation in order to develop production processes, create product value, and enhance marketing potential. As a result, it will improve the quality of life of people in provincial areas, as well as implement to drive and promote MHESI's plans and projects in different provinces. Therefore, MHESI's front-end unit is an essential body to coordinate cooperation from organizations under MHESI, a network of higher education institutions, together with local agencies in operating technology transfer, innovation and development of higher education, science, research and innovation to transform Thailand as an innovation nation.

7) The National Digital Learning Platform of Higher Education will be promoted for the recognition of international academic communities. Due to the COVID-19 pandemic, the Thai MOOC has accelerated the efficiency of online teaching and learning platforms of the Thai MOOC system by delivering more courses available in variety of disciplines for various groups of learners. The curriculum is designed to focus on concise content and ease of learning to support a wide range of learners, especially in-service workers in the industrial and service sectors affected by the COVID-19 crisis. These study programs include enhancing the skills of workers, providing opportunities for workers to enhance their capacities, as well as uplifting the skills of in-service workers by means of upskilling and reskilling. The Thai MOOC has also supported learners with hearing impairments to be able to read the content and learn without any barriers. They can also communicate and interact with instructors and cohort students through discussion. In addition, the Thai MOOC has developed its teaching and learning on par with international standards and expanded the network of cooperation with both public and private sectors within the country. Furthermore, the Thai MOOC has also strengthened its international cooperation networks with international online course service providers including the National Institute of Lifelong Education and KMOOC of the Republic of Korea, JMOOC of Japan, the National Open University of Taiwan and Taiwan MOOC of Taiwan, and Xuetangx of the People's Republic of China.

Part 2: Milestone I situation in 2021

Achievement Scenario 1: Quality and quantity of manpower to support national development and changes in accordance with global trends. In 2020, the World Economic Forum (WEF) did not publish a report on the competitiveness rankings of each country. In the Global Competitiveness Report 2019, Thailand was ranked 40th out of 141 countries. The indicators in Pillar 6: Skills, which consist of skills of future manpower, i.e., critical thinking in teaching, Thailand ranked 89th, up from 97th in 2018, which is close to the target value in the country's higher education plan to produce and develop manpower for 2021 - 2027, aiming for Thailand to be ranked no lower than 87th in the world in 2021. In the category of Skills of the Current Workforce, Thailand ranked 79th, down from 66th in 2018, significantly lower than the target of 70th in 2021. As for the category of Ease of Finding Skilled Employees, Thailand ranked 86th in the world and ranked 6th in ASEAN. It is close to the 2021 target, ranking no lower than 85th in the world.

According to the analysis of higher education statistical information data in 2020 that meets the strategic goal of human capacity building, 67.75 percent of graduates are employed within one year after graduation, which is much lower than the 2021 target that set the target at 75 percent. In 2020, the proportion of students in science and technology to other disciplines was 66:34, which is close to the target of 2021, which is set at 67:33. This reflects that higher

education, production and development of manpower is in line with the goals and meets the country's needs both qualitatively and quantitatively. The proportion of academic personnel classified by doctoral degree qualifications compared with those lower than doctoral level is at 45:55, reflecting that the implementation is close to the target indicator in 2021, set at 47:53.

Achievement Scenario 2: Research for generating body of knowledge and innovation for sustainable national development, the overview of Thailand's Competitiveness in 2020 as published by the International Institute for Management Development (IMD) and the World Economic Forum (WEF), Thailand's competitiveness was ranked 29th out of 63 countries worldwide. This is down from 25th place in 2019. Whereas the WEF's Global Competitiveness Index 2020 does not publish a ranking of the country's competitiveness. However, WEF publishes an assessment report, "The Economic Transformation Readiness" providing accounts on readiness on resilience after the crisis and economic reform for the future and WEF publishes the ranking again in 2021. According to the WEF's Global Competitiveness Index 4.0 in 2019, Thailand ranked 40th out of 141 countries globally, down from 38th in 2018. Besides, the World Intellectual Property Organization (WIPO) published Global Innovation Index 2020, and innovation in Thailand ranked 44th out of 131 countries worldwide, down from 43rd in 2019.

Overall, Thailand's R&D investment in 2019 accounted for 1.14 percent of the GDP, which is relatively small compared to other countries/economies such as South Korea, Japan and Taiwan.

Publication of research articles, in 2020, according to Scimago Journal and Country Ranking, Thailand was ranked 44th out of 240 countries worldwide. The number of citations published in the Scopus database is 18,882 citations.

The above data shows that Thailand should pay more attention to the development of research and innovation in the country in order to drive the economy and society, which affects the country's sustainable development goals.

Achievement Scenario 3: Higher education institutions meet their identities and strengths to ensure the quality of the higher education system. The number of higher education institutions that pass integrity and transparency assessment (ITA) criteria is 86 percent, targeting 60 institutions. ITA is conducted by the Office of the National Anti-Corruption Commission (NACC) aims to uplift the improvement and development of integrity and transparency in the public sector including public higher education institutions. In fiscal year 2020, higher education institutions had an average assessment score of 87.46, classified as A-level. The highest score was 98.73 points and the lowest score was 66.95 points. Assessment score is classified into areas, namely: operation, expenditure of budget, power executing, property utilization, corruption solving, quality of implementation, communication efficiency, improvement of jobs, disclosure of information, and resolution of corruption. The average ITA score for higher education institutions ranged 80.32 – 93.41, which is classified as A-B level. However, the goals of management and good governance for 2021 for higher education institutions is at 86 percent, targeting 60 institutions. The assessment

results in fiscal year 2020 were compared with the targets, there were 55 higher education institutions that achieved the target. While the next 5 institutions had an average score between 85.90 - 85.47, which was close to achieving the target in the fiscal year 2021.

The public sector has high performance comparable to international standards and is agile. Digital Government Maturity Model (Gartner) (higher education institutions only) Target Level 2 is directly affected by disruptive technology. The current Thai society is challenged by the following factors, namely: changing population structure; accelerating the development of targeted industries in the country; inequality problem; the COVID-19 crisis, which has driven the government to accelerate the transition to digital government. The provision of services and management of teaching and learning of lifelong learning with digital learning platforms by promoting the development of online courses, digital content, digital collections, and virtual mobility, are factors that will enhance the digital services of the government in education. The public service and government efficiency are set with targets that must be achieved in 2022. The goal is that public sector has high performance comparable to international standards and is agile, and the Digital Government Maturity Model (Gartner) is at level 2 and its performance for the fiscal year 2020 has been reported as below target, which is a risk.

Higher education responding to the enhancement of competitiveness according to University Education by IMD, target No ≤42nd as published by The IMD World Competitiveness Center has ranked higher education in response to Thailand's competitiveness in 2020 ranked 38th, while in 2021, the target is set at 42nd or better ranking. Nevertheless, the results of the rankings are still pending.

Ranking of higher education institutions will be better in the University Ranking by Subjects to be among the top 200, targeting 7 higher education institutions. According to the QS World University Rankings by Subject 2021, only Mahidol University is ranked 142nd in life science and medicine; Chulalongkorn University is ranked 242nd in arts and humanities, ranked 150 – 200th in business and management studies, and 244th in engineering and technology; 244th in natural sciences, and 202nd in social sciences and management.

Higher education institutions ranked among the top 200 of the World Class University Ranking, no target was set for 2021, however, the Times Higher Education World University Rankings reported that Thailand has higher education institutions in the World University Rankings 2021 in the ranking between 600 – 801.

Establishment of Higher Education Development Fund is targeted with 1 fund. Nonetheless, the creation of a mechanism for the Higher Education Development Fund to create financial stability in the higher education system is still in the process of being established, which must be approved step by step by the Ministry of Finance and the Council of Ministers.

Part 3: Gaps and challenging of Milestone II - III

The development of manpower in both the education system and those in the labor market or in the non-aged group to come to be manpower with key attributes including technical competency, occupational competencies with operational skills to support current and future jobs, and global citizenship to cope with future changes. One of the significant challenges is to augment the quality and potential of lecturers and higher education personnel to a higher level, and to enhance their academic achievements to be recognized internationally and among international academic communities. A notable challenge is the impact of the COVID-19 pandemic in the past year, that may put students at risk of dropping out of the higher education system, as well as declining skills of graduates, and lack of opportunities to develop the necessary skills and knowledge. Therefore, higher education must adapt to be able to tackle the aforementioned new situations and challenges.

The promotion of higher education research ecosystem, currently, Thailand needs to drive the development to be a self-reliant country, particularly in technology. In this regard, higher education institutions are one of the driving mechanisms for national development, that can create and develop personnel with essential skills for the 21st century, generate body of knowledge and innovation. The aims are to drive the economy, society and the country, thus, an ecosystem with the potential to support the advancement of science and technology, as well as knowledge and innovation is needed to enhance Thailand's competitiveness.

The reorganization of higher education by means of the Integrity and Transparency Assessment (ITA) conducted by the Office of the National Anti-Corruption Commission aims to improve the integrity and transparency of the public sector, including higher education institutions. Transforming the public sector to become a digital government by providing lifelong learning services with the digital learning platform is one of the highlights of the plan. The implementation includes the promotion of the development of online courses, digital content, digital collections, and virtual mobility, which is one of the factors that will enhance digital government services in education. Moreover, the education competitiveness ranking and international ranking of university education by IMD are the goals of higher education institutions to accelerate their potential development towards academic excellence.

1.5 Roles of higher education in the current context

According to the Higher Education Act of 2019, Section 26 stipulates that higher education institution has the following duties and powers: 1) Education management; 2) Research and innovation; 3) Academic services to society; 4) Preservation of arts and culture; and 5) Other duties and powers as required by law.

From analyzing the environment and factors both inside and outside the higher education system to know the impact of change. Analysis of national policies and plans for clearly passing on the direction of development, including statistical analysis to know the current potential. All of this will be summarized as the role of higher education in the current context (SWOT analysis) as follows:

Strengths

• Higher education institutions are the main academic and professional institutions in the creation of knowledge, technology, and innovation. They are also a source of production and development of human capital to enhance the quality of Thai society.

• Higher education institutions are independent and are sources of collecting diverse knowledge. They are providing open opportunities for access to education and sufficient to support the population entering the system.

• Higher education integrates its works with many sectors to form a strong consortium at the international, national, and spatial community levels.

• Higher education institutions are a source of production and gathering of researchers, research and academic works by transferring research works for utilization tends to increase.

• Thai higher education is international in teaching and learning, such as teaching international programs, joint ventures or cooperation with foreign institutions with higher education institutions or the private sector of the country.

Weaknesses

• Higher education institutions rely on government support, as well as following both budget allocation mechanisms and government management. As a result, the development of managerial efficiency is characterized by weakness and delayed adaptation.

• Higher education institutions also confront governance issues in self-management. It affects the quality of education management throughout the system. This includes disinclination to deliver several courses to increase revenue, and lack of development of the distinctive uniqueness of the institution.

• Researchers and academic works are also concentrated, and there is the problem of balancing the research workload with the teaching workload of lecturers.

• Quality of technology and analytical systems is at a low level, such as lack of qualitative performance assessment systems, lack of manpower production planning system both inside and outside the higher education system, lack of research evaluation system in the country as a whole. The deficiencies also include a lack of efficiency in index analysis of graduate productivity and educational waste. The information database system also lacks good quality, accurate and up-to-date data and information, as well as the systematic management that supports disadvantaged groups and people with disabilities, is not effective enough.

Opportunities

• The rapid evolution of digital technology and globalization will drive opportunities for reinventing and transforming higher education.

• Generation Zoomer and Alpha constantly want to develop their new knowledge and skills. It motivates higher education to seek ways to meet their diverse needs.

• Higher education has a broader target group, resulting in the transformation of education management to lifelong education that covers the elderly and the working age.

• Government policy places great emphasis on the production of manpower in higher education and high-quality research to support an important mechanism for national development.

Threats

• Government funding will have even more conditions and limitations. This can lead to more self-reliance that will activate commercial higher education and sub-standard education management.

• The surge of competition in higher education has become more intense both domestically and internationally. In this regard, the mobilization of higher education manpower to exchange experiences, knowledge, technology, and specialized expertise to bring back to develop the country is urgently needed. However, higher education has not been able to adapt its new role instantly and to respond in a timely manner to global changes in the international academic platform.

• Changes in the demographic structure of the country are shrinking. As a result, the tertiary education age group (18 - 22 years) is decreasing. This has impacted the number of students in higher education, which must urgently adapt to situations such as financial risks.

• The reversal of social trends due to the COVID-19 pandemic has resulted in a slowdown and stagnation of activities throughout the supply chain in Thai society, including activities related to international relations. This has ramifications on higher education in many aspects, such as the mobilization of students and staff, academic exchanges, and an increasing number of unemployed people. There are also problems with the expenditure of limited resources to solve urgent problems, which will post long-term effects on development.

• Global climate change has threatened agricultural productivity decreases, while demand for water and energy increases. Many countries around the world have implemented the integration of human resource development in parallel with ecological footprint.

Roles of higher education

Higher education serves as the foundation for the leaps and bounds development of manpower and body of knowledge for sustainability with no one left behind

S

- Higher education institutions **are the main academic and high-professional institutions**
- Higher education institutions **are independent and sources of diverse knowledge**, **open** and **sufficient** access to education
- **Integrated** higher education works **with strong multi-sectors**
- Higher education institutions **are a source of production for researchers and research output** and academic achievements.
- Thai higher education is **international in teaching and learning**

W

- Higher education institutions **rely on government support both budget mechanisms and government management**
- Higher education institutions **also confront governance issues** in self-management
- **Researchers and academic works are concentrated.** There is also a problem of balancing workload between research and teaching
- **Quality of technology and analytical systems are at low level**

O

- **Rapid evolution of digital technology and globalization** will be the driving force to create opportunities for reinventing and transforming higher education
- **Higher education** seeks ways to meet diverse needs for the **younger generations (Gen-Zoomer and Alpha)**
- Higher education has a **broad target group**
- **Government policies place importance** on the production of manpower in higher education and high-quality research as an important mechanism for national development

T

- **Government budget will have more conditions and constraints**
- **More intense competition in higher education**
- **Changes in demographic structure of the country are shrinking. This has impacted number of students in higher education**, and needs urgent adaptation to financial risks.
- **Due to the COVID-19 pandemic, there has been a slowdown to a recession of activities. This has limited higher education in many areas.**
- **Climate change impacts decreasing agricultural productivity,** greater demand for water and energy, human resource development should be in parallel with ecological footprint.

Part

2

Strategy for Higher Education Development

2.1 Vision and mission of the plan

In light of major changes in the world in various dimensions, both changes in demographic and social structure, rapid technological advances in globalization, in conjunction with the economic conditions during the COVID-19 pandemic have aggravated challenges for the labor market and directly affected the country's manpower. Climate management, degradation of natural resources and the environment, as well as political directions, all these factors have affected the society, economy and environment of the country. In addition, the government's plans and policies that set the country's development direction "Thailand is stable, prosperous, sustainable, a developed country with the development based on the philosophy of Sufficiency Economy" by virtue of the potential of higher education according to the 4 missions, namely: education management; research and innovation; academic services to society; and preservation of arts and culture, in order to lead to the production of graduates and the development of sufficient human resources both qualitatively and quantitatively. Research to create new knowledge, technology, and innovation to meet the country's challenges, major problems and development. The product of such higher education will need a novel higher education system that needs to be developed by adjusting the entire driving system, including strategies and mechanisms for producing graduates and developing qualified manpower to meet the needs of the labor market. The goals of the strategy include the development of competencies and potential of personnel in the higher education system, financial security, readiness of digital technology, good governance in management, as well as relevant partners in government, private and social networks have led to the formulation of higher education plans with the following objectives. To serve as a framework for higher education institutions to be the foundation for driving the country's development to be more competitive and lead the country to achieve its well-organized escape from the middle-income trap.

VISION

Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society

Conforms to

The Philosophy of Thai higher education and the new higher education system in equipping graduates with knowledge and skills and developing the workforce.

"Thai higher education aims to produce graduates and develop the workforce of all ages (lifelong learning) to have morals, ethics, and necessary competencies and to be able to support sudden and emerging social and technological disruption for now and in the future. It also intends to enhance competitiveness of the country at the international level and to improve the quality of life of the people, while upholding the love and pride in the national heritage of good institutions, culture, and traditions. In producing graduates and developing the workforce, it needs to be carried out in collaboration with various sectors such as the government, private sector, civil society, and the community closely."

Mission of the plan

1. Raising the quality of higher education to be comparable to that of developed countries. Create wisdom for Thai and global societies. Raise the potential of human capital to be a factor to increase competitiveness. Raise the internationalization level. Enhance the potential of science, technology, and innovation to be a driving force for national development and changes in the era of globalization.

2. Transferring knowledge and innovation widely and include stakeholders in the agricultural, industrial, and services sectors to be able to harness science, technology, and innovation to increase competitiveness and be environmentally friendly.

3. Expanding higher education opportunities to cover the school-age population, disadvantaged groups, working people, and the elderly to have access to quality education, especially the disadvantaged groups. Give importance to skills and competencies development according to the needs of the labor market. Create jobs and be an entrepreneur in their local community or hometown.

4. Upgrading the higher education system according to the principles of good governance consistent with the academic freedom and self-management of higher education institutions. Enabling the development of professional management system by focusing on reinventing the development of various higher education institutions to be able to benefit the country's development in various dimensions.

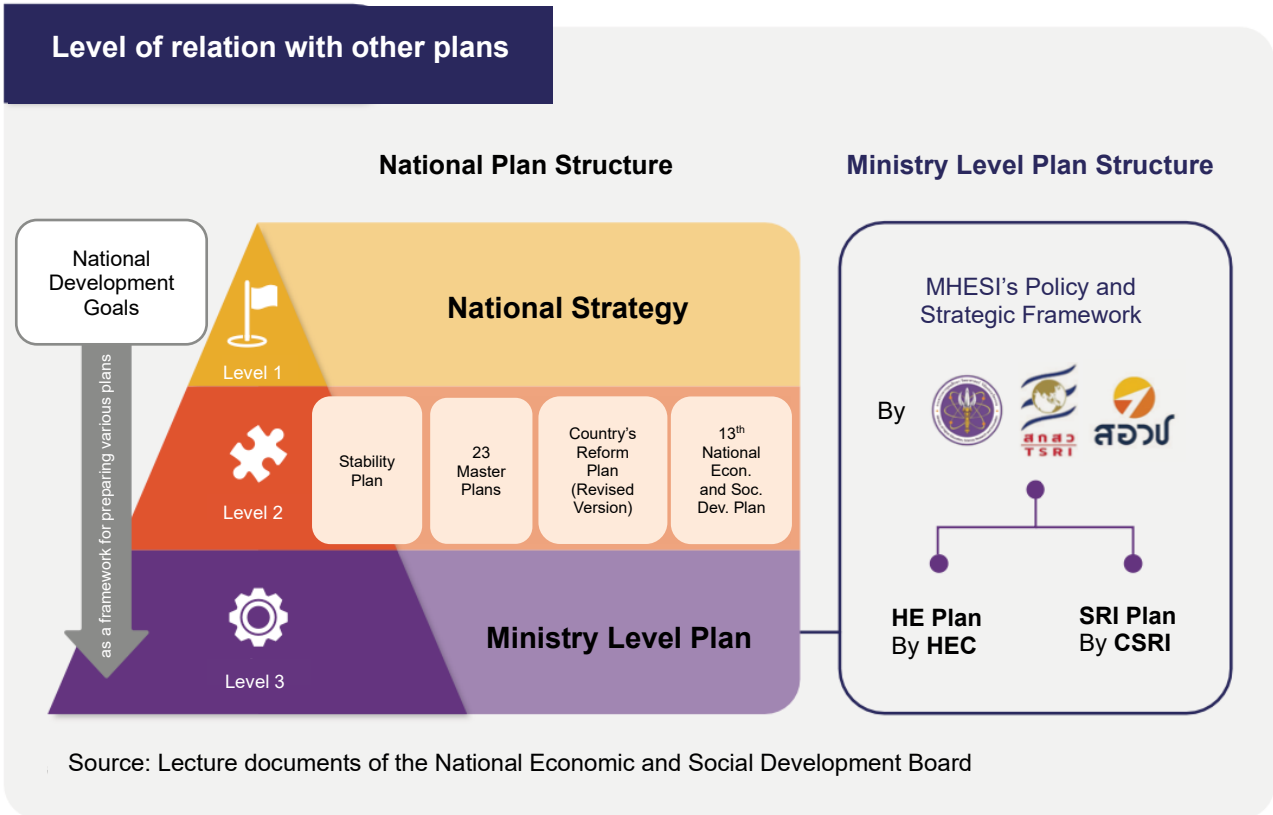


Figure 26 shows relation with other plans

2.2 Strategic map for higher education development

Vision: Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society Roles: Higher education is a foundation for development of manpower and leaps and bounds knowledge for sustainability with no one left behind		
Strategy 1: Human capacity-building	**Strategy 2: Research ecosystem strengthening**	**Strategy 3: Higher education transforming**
Goals: 1. Providing lifelong learning education, and opportunity for accessing quality, standard, and flexible education suitable for manpower of all age groups by developing curriculums for desired learning outcomes. 2. Graduates/manpower are developed; and their reskilling, upskilling, and new skilling are benefitting their careers and livelihood. Their soft, hard, or transversal skill will be reeducated qualitatively and quantitatively to support the national development corresponding with changes of the world trends. 3. Graduates/manpower are aware of changing lifestyles that are environment friendly, supporting and consistent with the Circular Economy for sustainable development. 4. Fostering high potential and specialized personnel by means of enhancement of brainpower and concentration of talents.	**Goals:** 1. Research for creating body of knowledge, technology, and innovation. Transfer of technology and apply innovation for the sustainability of economic, social, and environmental dimensions. 2. Research and development resources in the higher education system can efficiently enhance capacity both academically and practically. 3. Higher education institutions ecosystem is conducive to increasing entrepreneurial skills and developing business potential by setting up administration and support office such as corporate university, start-up, spin-off, incubator, and accelerator, including intellectual property system and technology transfer, which will have efficient ramification to society and economy.	**Goals:** 1. Higher education system is efficient in resource management that can generate results, and good value for investment by adopting performance-based management with strict observation on the principle of good governance. 2. Higher education institutions are excellence according to their uniqueness/strengths to assure quality of higher education system and their outcome-based implementation will reflect the consistent in line with the needs of the community/society/country. 3. Higher education institutions are internationally recognized, and their operations are in congruent with to the current situation and the world in the 21st century.

Impact Level Indicators Human Achievement Index (HAI), *Target Value Index 0.7209* (People's Advancement is at the High Level), Human Development Index (HDI), *Target Value Index 0.825* (Very High Level of Human Development)		
Indicators 1. Gross enrolment ratio for tertiary education, both sexes (%) (SDGs indicator 4.3) (≤53rd). 2. Higher education institutions that admit people with disabilities, prepare educational equipment and tools. (Build and upgrade education facilities that are child, disability, and gender sensitive and provide safe, non-violent, inclusive, and effective learning environments for all by SDG4.a) (100 percent). 3. Skill of future workforce: Critical thinking in teaching (WEF) (≤70th). 4. Skills of current workforce: Ease of finding skilled employees advocated by (WEF) (≤70th). 5. Skills of current workforce: Skillset of Graduates by (WEF) (≤31st). 6. Education: English proficiency – TOEFL scores (IMD (≤30th). 7. Employability of graduates within 1 year after graduation (90 percent). 8. Ratio of science students comparing to social sciences increases (35 : 65). 9. The number of academic personnel at the doctoral level increases compared to those below Ph.D., or Ph.D. : below Ph.D. (50 : 50).	**Indicators** 1. R&D productivity by publication: No. of Scientific articles by author's origin and the total expenditure in R&D as % GDP (IMD) (≤25th). 2. Research budget per GDP is increased (GERD) (2 percent). 3. International co-inventions: Number of patent family applications with co-inventors located abroad per million population. (WEF) (≤61st). 4. Patent applications: Total number of patent family applications per million population. (WEF) (≤66th). 5. Research institutions prominence index, Score on an index that measures the prominence and standing of private and public research institutions. (WEF) (≤39th). 6. Number of research and development personnel increases per 10,000 people (40 researchers). 7. International publications increased from the Scopus database (22 percent). 8. Number of products produced by community enterprises, SMEs, and agriculture have enhanced competitiveness on innovation and technology (250 products). 9. Graduates from Thai higher education institutions become technology-based startups (≥ 2 percent every year).	**Indicators** 1. Number of higher education institutions that passed the ITA assessment of at least 86 percent (83 institutions). 2. University education: University education meets the needs of a competitive economy. (IMD) (≤35th). 3. The Times Higher Education (THE) Impact Rankings is in the top 100 globally (≥5 institutions). 4. Higher education institutions are ranked in the top 100 University Ranking by Subjects globally (≥5 disciplines) (5 institutions). 5. Higher education institutions ranked in the top 200 of the World Class University Ranking (2 institutions). 6. Big data system linked with MHESI. (1 system). 7. Higher education institutions join the Reinventing University System process (25 institutions). 8. Number of international students studying in Thailand in the country's excellent disciplines increased (50 percent).

10. Academic tenure at the level of Prof., Assoc. Prof., Asst. Prof. increase compared to lecturer (40 : 60). 11. Lecturers in higher education institutions are of high quality, providing professional teaching and learning at level 3 and above (80 percent). **Guideline 1: Managing education for lifelong learning** Strategy 1: Integrating human resource development and environmental sustainability for transition to circular economy. Strategy 2: Creating equal and fair universal access to higher education opportunities with no one left behind. Strategy 3: Providing education for the elderly. Strategy 4: Connecting and strengthening other levels of education. Strategy 5: Creating environment conducive to all learners' lifestyle in higher education institutions. **Guideline 2: Enhancing quality of education and competency of manpower** Strategy 6: Adjusting quality supervision system and higher education curriculum standards. Strategy 7: Planning graduate production and manpower development qualitatively and quantitatively to respond to national development.	10. Innovation–driven entrepreneurship (IDEs) with increased income of 1 billion baht/year (≥1,000 cases). 11. Spin-off company that uses deep technology (≥3 businesses). **Guideline 1: Promoting research, innovation, and technology transfer** Strategy 1: Pushing research based on uniqueness and potential of higher education institutions for discovery of knowledge and production of future technology. Strategy 2: Upgrading research unit and creating research cooperation for technology transfer and innovation for social, economic, and environmental development. Strategy 3: Mobilizing overseas resources and expertise. Strategy 4: Allocating subsidies for research and transferring technology and innovation. Strategy 5: Developing skills, capacities of undergraduate, postgraduate or postdoctoral researchers. Strategy 6: Alleviating limitations and obstacles affecting research production. Strategy 7: Promoting and developing research and innovation ecosystem and developing research personnel in higher education system.	**Guideline 1 Enhancing management and good governance** Strategy 1: Studying and research good governance systems and formulate guidelines to promote good governance in higher education institutions. Strategy 2: Disclosing of information to promote to promote good governance in the higher education system. Strategy 3: Assessing good governance of higher education institution. **Guideline 2: Reinventing higher education institutions development according to diverse uniqueness** Strategy 4: Setting up development focus for higher education institutions to benefit national development and global higher education institutions rankings (World University Ranking). Strategy 5: Developing higher education institutions as education hub for CLMV countries at regional and international levels (International Hub for Higher Education).

Strategy 8: Promoting experiential education and work-integrated education. Strategy 9: Adjusting education system to accommodate non-school-age learners. Strategy 10: Strengthening citizenship for learners. Strategy 11: Strengthening academic expertise in social sciences, humanities, fine arts, and Oriental Studies. **Guideline 3: Fostering high-quality personnel (enhancement of brainpower and concentration of talents)** Strategy 12: Raising lecturers' academic qualifications and tenure. Strategy 13: Supporting academic personnel management framework in higher education institutions. Strategy 14 Elevating academic community to be recognized at international level.	**Guideline 2: Developing infrastructure or enabling factors within higher education institutions that promote development of entrepreneur on innovation** Strategy 8: Developing entrepreneurship education. Strategy 9: Sharing of research benefits and intellectual property.	**Guideline 3: Ensuring financial security of higher education system** Strategy 6: Reforming the financial system for higher education. **Guideline 4: Developing digital higher education** Strategy 7: Developing digital infrastructure and big data systems for higher education and research.

2.3 Strategies and guidelines

Strategic issues that drive the country's manpower's production and development consist of 3 issues: graduates and manpower, research ecosystem, and new higher education.

Strategic issues

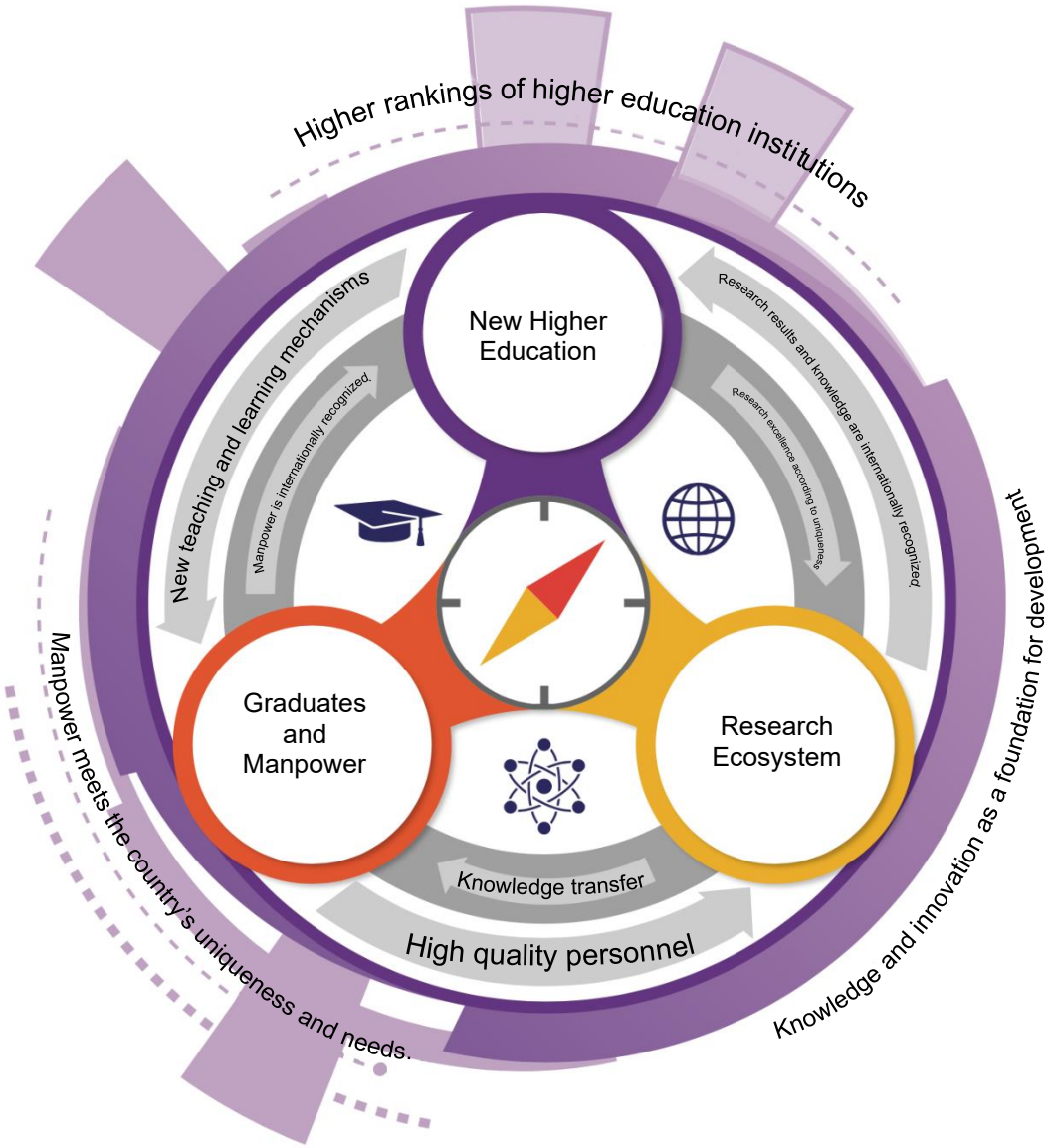


Figure 27 Relationship of strategic issues for higher education development

Strategies that drive the manpower's production and development of the country

Strategy 1: Human capacity-building

Higher education gives emphasis on the importance of lifelong learning for all (SDGs) by focusing on human development along with creating awareness of human activities' impact on natural resources and environment (ecological footprint). Therefore, higher education will provide opportunities for all citizens to have unlimited access to lifelong learning, to have knowledge and skills ready for the changes of the future (transversal skills). The plan will be implemented in parallel with the enhancements of quality of education and manpower competencies by means of planning and adjusting flexibility and diversity of quality higher education system and standards in line with types or groups of higher education institutions, at the same time, strengthening the high-quality personnel of higher education institutions and pushing forward the higher level of the Thai academic community to be recognized internationally.

Guideline for implementation plan

Guideline 1: Managing education for lifelong learning

Strategy 1: Integrating human resource development and environmental sustainability for transition to circular economy

The government is responsible for the formulation of policy, pattern/method, and incentives for higher education institutions to design/develop curricula and manage teaching and learning. Education will lead to the development of learners' vision, skills, and ways of thinking, in particular awareness of impact of human activities on global climate change, deterioration of natural resources and environment, and the importance of the circular economy. There should be encouragement for higher education institutions to play roles in research to create new body of knowledge, ready to transfer technology and innovation to all sectors (such as the public, operators and industrial sectors). It will result in creating balance in national development in social, economic and environmental dimensions, that will maintain world stability, such as increasing efficiency in the use of resources to the highest effectiveness and reducing waste as much as possible – that is, conserving resources, products and materials within the economic system for as long as possible. It is the key to sustainable recovery after the COVID-19 pandemic and leads to sustainable development.

Strategy 2: Creating equal and fair universal access to higher education with no one left behind (access and equity in higher education)

The government establishes Flexible Learning Pathways (FLPs) (UNESCO) to meet the needs of diverse learners and provide infrastructure and facilities to support everyone to access quality education inclusively and equally (SDGs). Higher education institutions provide education for all without discrimination with quality and meeting academic and professional standards without limiting the duration of graduation. The implementation includes supporting students who lack funds to receive education until completion of a bachelor's degree. The government should provide financial support for higher education institutions and students, such as scholarships, loans, or support for working while studying.

Strategy 3: Providing education for the elderly

Higher education institutions design/develop curricula and provide education for the elderly for knowledge development and skill enhancement, professional development, and active citizenship promotion (UNESCO) to be ready to cope with changes for the future (transversal skills) and be self-reliant with quality.

Strategy 4: Connecting and strengthening other levels of education (technical/vocational education)

Higher education institutions participate in raising the quality of basic and vocational education to enhance quality manpower who can work efficiently in manufacturing industries by using their knowledge. In this regard, personnel of higher education institutions will support by means of utilizing their expertise to serve as mentors, to provide advanced vocational training, and to enhance production and development of in-service teachers' potential.

Strategy 5: Creating environment conducive to all learners' lifestyles in higher education institutions (campus life and universal design)

Higher education institutions provide an atmosphere conducive to teaching and learning and students' lifestyles. It includes indoor and outdoor social life and sports activities, as well as providing adequate leisure facilities. Architectural design of campuses should be of universal design fit for all groups of people by considering equal and equity access–for those who do not have special needs to those with special needs. Special attention should be focused on those with physical disabilities and those with intellectual disabilities, etc., to receive education without obstacles and to live normally and happily in higher education institutions.

Guideline 2: Enhancing quality of education and competency of manpower

Strategy 6: Adjusting quality supervision system and higher education curriculum standards

The government sets up higher education standards and higher education curriculum standards that are flexible and diverse in line with the types or groups of higher education institutions. The plan aims at strengthening general education, and developing models for measuring and evaluating graduates' characteristics from their learning outcomes by focusing on their actual learning achievements. Higher education institutions concentrate on enabling students to achieve their learning outcomes that progress according to individual differences and to provide opportunities for them to access higher education channels by means of using their experiences or accumulation of their skills and knowledge, that correspond with the country's development direction in accordance with the BCG Model (agriculture and food, medical and health, tourism and energy, materials and biological chemistry). It is also intended to respond to target industries according to MHESI's policy framework and strategies[1] such as S and new S-Curve industries, that are consistent with uniqueness and academic excellence of each type or group of higher education institutions.

Strategy 7: Planning graduate production and manpower development qualitatively and quantitatively to respond to national development

The government determines direction for producing graduates and developing manpower to respond to national development. It serves initiatives under the BCG model (agriculture and food, medical and health, tourism, and energy, materials and biological chemistry); target industries according to MHESI's policy and strategic framework; and targeted S and new S-Curve industries to support the transition to a circular economy. In this regard, higher education institutions must produce graduates and develop manpower in accordance with the government policy statement so that the country has human resources with knowledge and skills (hard, soft, and transversal skills) to cope with changes in the world in various dimensions, as well as recognizing the importance of the global climate, and natural resources and the environment.

[1] Targeted industries according to MHESI's policy and strategic framework for 2023-2027 include the advanced medical products industry; digital industry; artificial intelligence; intelligent electronics; robots and automation; electric vehicle industry, batteries and essential parts; railway industry; logistics system; food and fruit industry; functional ingredients; functional food; novel food; and creative tourism industry.

Strategy 8: Promoting experiential education, cooperative education, and work-integrated education (Cooperation and Work-Integrated Education: CWIE)

The government promotes experiential learning and work-based learning (WBL) or work-integrated learning such as cooperative education, internship, and volunteering for students to apply theoretical knowledge into practice in real settings. Learning under this model will allow students to gain practical working skills and encourage higher education institutions and business/industrial operators to cooperatively design and plan work-integrated learning (curriculum, teaching, and assessment) to bridge the gap between demand and supply of skills needed in labor market, and in line with the direction of national development according to the BCG Model, target industries according to MHESI's policy and strategic framework, target industries (S and new S-Curve). As a consequence, the government sector may officially expand WBL with incentives such as tax reductions for operators participating in WBL.

Strategy 9: Adjusting education system to accommodate non-school-age learners (reskilling, upskilling and new skilling)

The government devises a flexible and suitable process to develop Thailand national credit bank system to be suitable to students' needs so that everyone can conveniently and efficiently equate their educational qualifications. There are also precise measurement and assessment processes of graduates' characteristics in terms of learning outcomes according to the uniqueness and academic excellence of each type or group of higher education institutions to convert into a credit bank to increase potential and working capacity. Higher education institutions design/develop curricula and manage teaching and learning consistent with the demand-driven and results-oriented workforce to provide learners with knowledge and hard, soft, and transversal skills development that are consistent with the needs of labor market and ready to cope with future changes.

Strategy 10: Strengthening citizenship for learners

Higher education aims to produce graduates and to develop manpower of all age groups to be equipped with morals, ethics, and competencies essential for rapidly changing society and technology at present and in the future, and they will be quality citizens under the democratic regime of government with the King as Head of State. They should be instilled with the principles of a democratic citizen, respect laws, and apply the philosophy of sufficiency economy. In addition, they should have essential skills such as critical analytical thinking, understanding aspects of relations, openness, respect for diversity, understanding differences between cultures, self-responsibility and responsibility for others, society, and the environment. In addition, their social skills should also be trained to be competent in interpersonal relations, foreign language skills, digital skills, musical skills, body response to movement, environmental conservation, as well as promoting correct thinking by cultivating discipline, morality, ethics, public spirit, and preserving the country's culture. Higher education institutions should apply the strategy in setting standards

for learning outcomes (Domains of Learning) for ethical and moral attributes in the higher education qualifications.

Strategy 11: Strengthening academic expertise in social sciences, humanities, fine arts, and Oriental Studies

The government cooperates with higher education institutions to promote and create academic expertise and essential related knowledge, which is the foundation of humanity and the context of a multicultural society. This includes philosophy, religion, language, literature, art, music, and culture in various fields based on diversity both at the local and international levels, etc. There should be encouragement to support the use of research results for sustainable development of the country through connecting Thailand to the region and the world. In this regard, higher education institutions should be promoted to create domestic and international cooperation in the social sciences, humanities, and fine arts, as well as to develop systems and infrastructure for research in these disciplines. Moreover, higher education institutions should pay more attention to integrate body of knowledge in the manner of multidisciplinary and interdisciplinary knowledge to support the inheritance, preservation, and enhancement of academic knowledge in social sciences and humanities, in supporting the promotion of multiple intelligences for the Thai society.

Guideline 3: Fostering high-quality personnel (enhancement of brainpower and concentration of talents)

Strategy 12: Raising lecturers' academic qualifications and tenure

The government sets up a lecturer's professional standard framework to include research competencies, teaching and learning management, and academic service, which will bring about accomplishment of the mission of academics in addition to educational qualifications. Higher education institutions encourage the enhancement of professionalism of lecturers, developing their qualifications and academic tenure. Academic personnel are encouraged to develop their professionalism in curriculum design and development, teaching and learning management, coaching and mentoring systems, which will enrich them to go beyond academics and to become specialized experts in their fields who can support research to enrich body of knowledge in their specialized areas. As a consequence, academic works will be published in recognized journals domestically and internationally, as well as taking sabbatical leave to seek enrichment of their new academic knowledge from both within and outside the country and to apply gained knowledge for teaching and research.

Strategy 13: Supporting academic personnel management framework in higher education institutions

The government supports academic personnel competencies development. Higher education institutions set a clear career path (career achievement) to motivate academic personnel to advance toward goals and expected positions. It also stimulates reverse brain drain by encouraging potential human resources domestically and abroad to join academic community according to uniqueness and strength of individual institutions.

Strategy 14: Elevating academic community to be recognized at international level

The government supports elevating of Thai academic community to be recognized at international level by establishing networks linking personnel and staffs of agencies, higher education institutions, and research institutes. There are necessary and appropriate supports of resources and infrastructure for the development of potential/capacity/expertise in social sciences, humanities, arts, sciences, and advanced technology for the Thai academic community to be accepted, recognized, and honored internationally as a hub of talents, knowledge and innovation.

Strategy 2: Research ecosystem strengthening

Promoting the higher education research ecosystem by focusing on developing ecosystem conducive to development of body of knowledge, technology, and innovation by means of encouraging research based on uniqueness and potential of higher education institutions. Enhancing research units, creating research collaborations with various sectors, and developing research skills and entrepreneurial thinking skills, as well as developing infrastructure or enabling factors within higher education institutions to make higher education a source of body of knowledge, technology, and innovation, and ready to transfer them for sustainable social, economic, and environmental development.

Guideline for implementation plan

Guideline 1: Promoting research, innovation, and technology transfer

Strategy 1: Pushing research based on uniqueness and potential of higher education institutions for the discovery of body of knowledge and production of future technology

Higher education institutions determine their focus on knowledge discovery (scientific discovery) and future technology production (frontier research) according to their uniqueness and potential. They are to be ready to transfer and apply for sustainable development for the balanced social, economic, and environmental dimensions in accordance with the 2030's agenda for the Sustainable Development Goals (SDGs). The government has roles in supporting higher education institutions to build sustainable research capacity and public relations to create awareness in various sectors on the importance of basic research (blue skies research), which is an essential factor for discovering new knowledge.

Strategy 2: Upgrading research unit and creating research cooperation for technology transfer and innovation for social, economic, and environmental development

The government has roles in pushing research units in higher education institutions toward standards of quality infrastructure, including products or services, management systems, organizations, or personnel that meet the requirements of international standards such as ISO. The aims are to advance essential science, technology, and innovation; ready to transfer for the development of new industries and services. The government encourages research cooperation between higher education institutions, research institutes, and interested sectors both domestically and internationally (global partnership) or joint venture in the form of holding company to harness knowledge, technology, and innovation that can create value or return on investment. In this regard, higher education institutions may establish legal entities or jointly invest with government or private sectors. The objective is to harness knowledge and innovation (corporate university) in providing academic services to society in the pattern of social engagement and enterprise, as well as developing community enterprises, grassroots economy, and innovation-driven economy, including technology-based startups, small and medium enterprises (SMEs), innovation-driven enterprises (IDES), and spin-off company that uses deep technology.

Strategy 3: Mobilizing overseas resources and expertise

The government sets conditions for support/leniency of legal requirements (visa requirements for entering the kingdom or customs duties), increasing benefits, creating motivation, supporting resources, and increasing agility of higher education institutions/research institutes and specialists to attract high-competencies human resources in fields that the country is lacking to come to transfer knowledge and innovation (brain gain) and support higher education institutions/research institutes to cooperate with such agencies/specialists for the creation of new body of knowledge in sciences, advance technology, and social sciences, humanities, and fine arts leading to new industrial and services development of the future.

Strategy 4: Allocating subsidies for research and transferring technology and innovation

Higher education institutions aim for specialized research, both blue skies research according to their expertise, and applied research according to the national research priorities under the government policy framework, by developing budget allocation criteria to subsidize research based on potential performance. In addition, there is a tracking system and economic evaluation to assess the value of operating results on society, economy, and environment to develop the economy towards a circular economy and sustainable development according to the Sustainable Development Goals (SDGs). In this regard, higher education institutions may seek research funding from domestic and research grants from international or external agencies, such as global research funding.

Strategy 5: Developing skills, capacities of undergraduate, postgraduate or postdoctoral research students

Higher education institutions support the development of research skills for graduates and researchers at the postgraduate and postdoctoral levels, such as creative thinking skills without discrimination, logical decision-making skills, targeted research proposal writing skills, costing and budgeting skills, and negotiation skills, creating continuity in talent mobility between higher education institutions, research institutes and industry to strengthen researcher personnel’s potential and capacities.

Strategy 6: Alleviating limitations and obstacles affecting research production

The government supports research production and the discovery of new bodies of knowledge by setting up a clear national research policy framework and national research priorities. It provides resources and increases flexibility in administration and management, promoting the building of competent researchers and strengthening the research system. The implementation includes developing a standardized data system and linking it with international agencies, and developing a research evaluation system, etc. Objectives of the plan are to support higher education institutions to be ranked in Research Institutions Prominence, and to encourage higher

education institutions to pay more attention to research by increasing flexibility for researchers in research production, such as balancing workloads between research production and others, as well as creating clear career path incentives, etc.

Strategy 7: Promoting and developing research and innovation ecosystem and developing research personnel in higher education system

The government has a role in promoting and developing research factors in the higher education system, such as emphasizing basic research possible for responding to the country's problems, establishment of adequate modern research infrastructure. The plan also includes the mobilization of world-class researchers, and promotion of international research cooperation, setting up clear career paths for researchers and graduates, funding for doctoral and postdoctoral scholarships, developing human resource management systems, planning, supervising, and monitoring of national research.

Guideline 2: Developing infrastructure or enabling factors within higher education institutions that promote development of entrepreneur for innovation

Strategy 8: Developing entrepreneurship (entrepreneurship education)

Higher education institutions develop curricula and support knowledge development of entrepreneurial thinking skills to interested people to support those who are studying, graduates, unemployed people, and employees. Objective of the plan is to enhance potential and capacity of individual who wants to be entrepreneur to start a business by focusing on technology-based startup, innovation-driven enterprises (IDEs), deep technology company or creative entrepreneurs.

Strategy 9: Sharing of research benefits and intellectual property (benefits sharing)

The government encourages higher education institutions to develop a management system of benefits gained from products of academic and innovation for commercial use. The management system includes developing guidelines and regulations for managing the sharing of benefits earned from intellectual property among partners including higher education institutions, researchers, and entrepreneurs. In terms of financial management, higher education institutions should be able to appraise value from intellectual property, including establishing a central agency (intermediaries) to perform administrative duties and technology transfer, such as the intellectual property management unit and systematic and efficient transfer of technology to society and the economy (research administration and support office).

Strategy 3: Higher education transforming

Higher education system transformation aims for higher education institutions to be advanced mechanisms for social, economic, and environmental development through management that adheres to the principles of good governance. Higher education institutions should manage their financial stability by spending the budget allocated by the government in the most cost-effective and the most beneficial manner. Higher education institutions need to develop their strengths based on the uniqueness and potential of higher education institutions to bring about efficient and effective operations that are transparent and accountable. As a consequence, they will enhance the competitiveness of the country to be recognized at the global level, as well as the development of digital infrastructure and database systems (Big Data) for higher education and research to increase the efficiency of learning management. Moreover, higher education administration will be able to expand educational services and promote educational equity, providing opportunities for all learners to have access to digital technology, able to utilize and develop their learning mechanisms independently.

Guideline for implementation plan

Guideline 1: Enhancing management and good governance

Strategy 1: Studying and research good governance systems and formulate guidelines to promote good governance in higher education institutions

The government must support studying and research to set up policies, recruitment and guidelines for the operation process for all levels. There must be a restructuring of inspection, quality assessment and quality standards of higher education institutions. There should be a heightening of equilibrium of checks and balances performed by two key bodies namely, professional council and faculty council of higher education institutions. They should also heed stakeholders' opinions, using research results to reform the management system in higher education institutions, and to improve their required missions to be consistent with the needs of society and country periodically. This will ensure efficient sustainable development, as well as laying down guidelines for strengthening good governance of higher education institutions by formulating guidelines for reforming the management system of higher education institutions. The guidelines will enable accountability, control of quality and standards of higher education institutions, as well as support institutions to achieve their goals efficiently and effectively.

Strategy 2: Disclosing of information to promote good governance in the higher education system

The government and higher education institutions must disclose and disseminate the facts regarding information on teaching and learning, research, financial direction, and progress of each mission to the public and stakeholders accurately, entirely, transparently, and accountably by linking the data into the higher education database. The government and higher education institutions should provide a communication system for disseminating knowledge and understanding of laws and social responsibility for the public and stakeholders to be able to access transparent information, facts for administrative decision-making, council/administrators/personnel recruitment, curricula development, teaching and learning management and research for the benefits of the society and country efficiently.

Strategy 3: Assessing good governance of higher education institution

The government enhances good governance and improves the governance mechanism for higher education institutions, including ethical compilation based on the principles of appropriateness, academic freedom, and category differentiation of higher education institutions. In this regard, higher education institutions must have mechanisms for promotion, monitoring, and enforcement efficiently, including organizing internal audit and inspection systems effectively.

Guideline 2: Reinventing higher education institutions development according to diverse uniqueness (Reinventing University)

Strategy 4: Setting up development focus for higher education institutions to benefit national development and global higher education institutions rankings (World University Ranking)

The government reforms the higher education system by reinventing university strategy to develop academic excellence in higher education institutions. They produce specialized high-level manpower according to the country's needs, ensuring that higher education institutions operate in line with the Ministerial Regulations on Grouping Higher Education Institutions 2021. The regulations aim to promote, support, assess quality, supervise, and allocate budgets to higher education institutions. There are three main driving factors as follows.

1. System drivers support systematic direction for higher education institutions' development. The critical driving factors consist of 1) governance and accountability system; 2) quality management framework; 3) funding system to allocate financial support for operational plans of higher education institutions; 4) engaging the participation of higher education institution’s personnel; and 5) collaboration facilitation platform.

2. Strategic focus for determination of higher education groups by considering their performance and potential of existing institutions. Their characteristics serve as differentiation factors

for the procedure, including the grouping of disciplinary departments organized by the central committee and the Council of the higher education institutions.

3. Formulation of strategic re-positioning plan development that is appropriate for higher education institutions through the process of creation, increase, reduction, and deletion, which leads to closing, reforming, changing, or building by preparing a performance agreement with the support of the parent organization. This procedure includes promotion for the World University Ranking with the following implementation guidelines. (1) Strategic profiles group of higher education institutions will be guided by the direction for their development inclusive of world-leading research development group, technology development and innovation promotion group, spatial community development group, and professional personnel production and development group including specific fields. (2) Strategic positioning, each higher education institution will analyze its appropriate strategic positioning. (3) Supporting and monitoring the development of higher education institutions systematically by supporting the strategic positioning specified through systematic driving mechanisms.

In addition, the higher education institutions transformation has a proactive strategy for developing higher education towards internationalization. They are 1) global cooperation network development; 2) internationalization at home promotion; 3) strategic partners enhancement; 4) Thailand branding promotion; and 5) strategic agile internationalization (IZN) team, which is the executing body for strategy 1 - 4 by performing as the central coordinator in driving the internationalization development together with higher education institutions and various agencies, both public and private, with MHESI's Office of Permanent Secretary serving as the central agency. It draws personnel from higher education institutions, government agencies, and international cooperation agencies to collaborate proactively with innovation.

Strategy 5: Developing higher education institutions as education hubs for CLMV countries at regional and international levels (International Hub for Higher Education)

• The government sector has a role to play as a national central agency, a change agent in one-stop service facilitating the entire system that is flexible, modern, and creates connections with all relevant sectors. The plan is to support higher education institutions to serve as hubs of higher education for CLMV countries, as well as at regional and international levels by means of exchanging personnel, knowledge, expertise, technology, research, and innovation. The implementation enhances Thailand's role in the region including playing a pivotal role on the world stage as an international strategic partner to facilitate the development of the country's competitiveness and important developments at all levels.

• Higher education institutions must pay attention to educational qualifications to meet international standards that can be equivalent to qualifications from higher education institutions worldwide to support and facilitate the mobilization of Thai students to study and work abroad (Outbound).

• Higher education institutions are internationally recognized for their curriculum, teaching and learning, and knowledge consistent with the current situation and for responding to the world in the 21st century according to uniqueness and expertise to attract more international students to study in the country (Inbound).

• Higher education institutions must create a learning culture about the world's current events for personnel and students to create awareness of living together and to be able to work in a multicultural setting.

• Higher education institutions must develop their organizational structures and modern technology together with a sufficient budget, a good management system, and creative visionary leaders with strategic plans as roadmap for educational marketing strategy. Institutions need to have competent lecturers and students. They need to create various curricula that use English as the primary language for teaching and learning, and there must also be a flexible teaching system, a good network, and sufficient scholarship available for distance learning.

Guideline 3: Ensuring financial security of higher education system

Strategy 6: Reforming the financial system for higher education

• The government allocates fiscal budget by focusing on demand-side financing, which is an integrated budget allocation and management system that is results-based to aim at producing quality and efficient results in accordance with the intent of the higher education system reform.

• Higher education institutions must be grouped following the Ministerial Regulations on Grouping Higher Education Institutions 2021. They must analyze their strengths and development areas, make selections for corresponding strategies, and propose the focus of higher education institutions that are consistent with the direction and focus of the country. They must present a plan for developing the higher education institutions' academic excellence, specialized high-level manpower production plan according to the needs of the country. In addition, they should formulate other development plans by focusing on project-based implementation to propose for budget allocations according to Section 45(3) of the Higher Education Act 2019.

• The government takes advantage of the higher education system development fund to support specific missions in developing higher education institutions' excellence and the production of specialized high-level manpower according to the needs of the country. The goals of the plan are to promote and support higher education institutions to carry out their missions in a direction that strengthens economic and social systems including enhancing the country's competitiveness. As a result, it will develop as a financial source that provides low-interest loans to private higher education institutions to develop higher quality education. The implementation will be consistent with the issue of resource allocation in higher education management according to Section 45(3) and Section 45(4) of the Higher Education Act 2019 with an efficient monitoring and evaluating system, that will be able to assess the achievement of the operational results in line with the intended direction.

Guideline 4: Developing digital higher education

Strategy 7: Developing digital infrastructure and big data systems for higher education and research

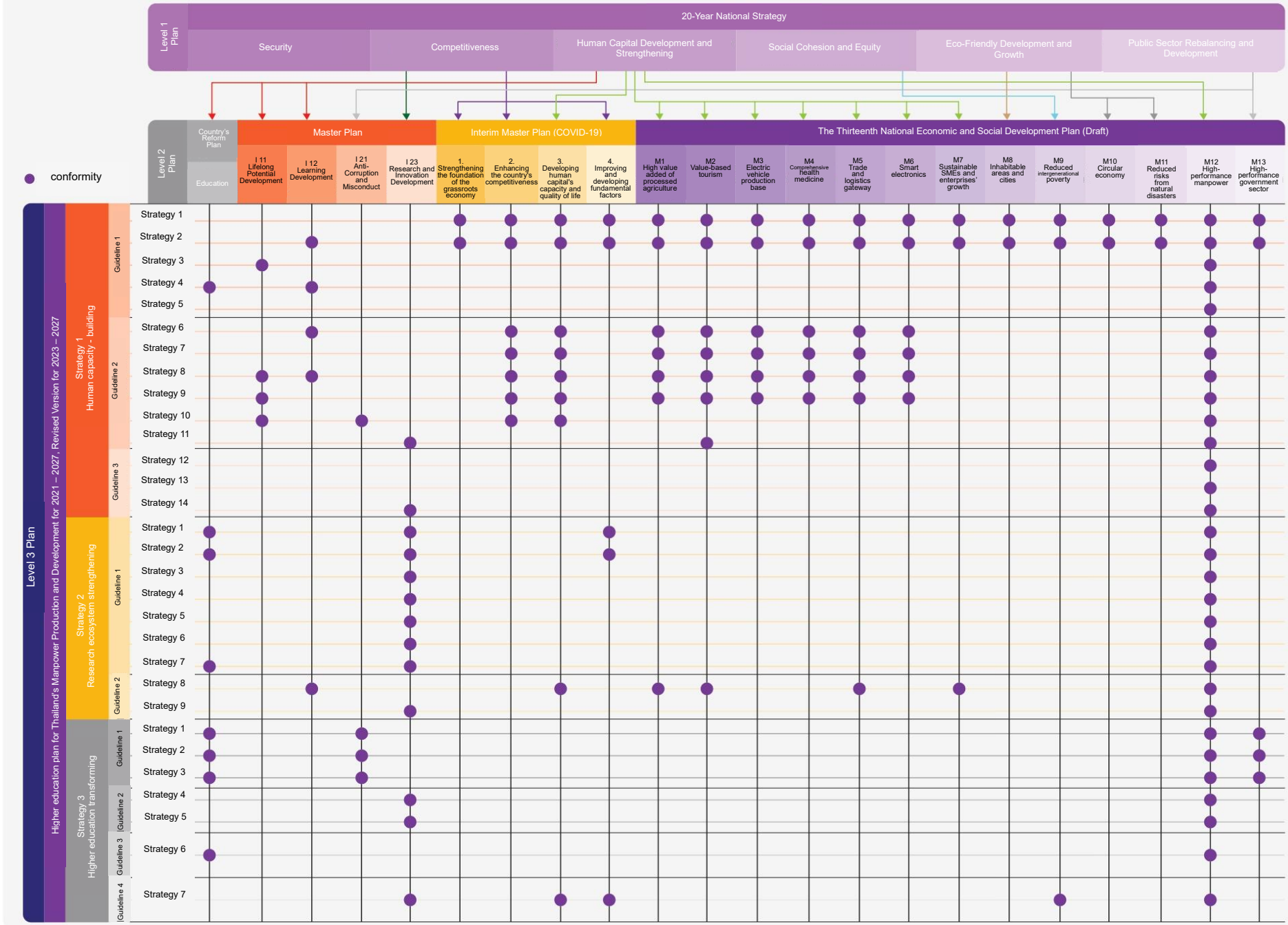
• The government creates an efficient central big data linking information systems between government agencies and the higher education database to develop an integration of the entire system. In this regard, higher education institutions and relevant agencies must deliver information about the higher education institutions' operations, educational standards, research and innovation, academic services, and other information pertinent to the Ministry. This allows the government to be able to analyze, synthesize, and process statistics for dissemination to the public. Higher education institutions can use information from big data to assess and improve themselves toward quality development and become leading institutions in the world rankings (World University Ranking).

• The government sets up standards for digital technology services at the higher education institutions level so that they can take advantage of the digital systems for managing education and research equally, as well as to access the internet and network efficiently, to connect knowledge sources from all over the world by providing digital technology services to higher education institutions at the educational rate or non-commercial rate.

• The government sets up standards for digital resources access for learning and research (digital content) from around the world to promote the development of online courses, digital content, digital collections, and virtual mobility. The policy also promotes the development of digital libraries to serve as learning centers in the digital age, information search, and sources of learning stimulation in a variety of new methods. The government coordinates negotiations for managing knowledge and research databases at the national and international levels so that the allocation of educational resources is appropriate and concurrent with the digital age.

• The government promotes the use of learning innovation and educational management platforms to focus on harnessing technology for learning by means of converting traditional learning to learning technology, such as online learning, teleteaching, virtual reality, and augmented technology. This will increase learning opportunities and efficiency, as well as develop the skills of lecturers including creating new learning and knowledge, developing particular capacity and skills in using technological media, emphasizing creating learning along with reducing related costs relating to teaching media.

Diagram of Linkage between the Conformity of Level 1, Level 2, and Higher Education Plans



Strategy 1	Integrating human resource development and environmental sustainability for transition to circular economy
Strategy 2	Creating equal and fair universal access to higher education with no one left behind
Strategy 3	Providing education for the elderly
Strategy 4	Connecting and strengthening other levels of education
Strategy 5	Creating environment conducive to all learners' lifestyles in higher education institutions
Strategy 6	Adjusting quality supervision system and higher education curriculum standards
Strategy 7	Planning graduate production and manpower development qualitatively and quantitatively to respond to national development
Strategy 8	Promoting experiential education, cooperative education, and work-integrated education
Strategy 9	Adjusting education system to accommodate non-school-age learners
Strategy 10	Strengthening citizenship for learners
Strategy 11	Strengthening academic expertise in social sciences, humanities, fine arts, and Oriental studies
Strategy 12	Raising lecturers' academic qualifications and tenure
Strategy 13	Supporting academic personnel management framework in higher education institutions
Strategy 14	Elevating academic community to be recognized at international level
Strategy 1	Pushing research based on uniqueness and potential of higher education institutions for the discovery of body of knowledge and production of future technology
Strategy 2	Upgrading research unit and creating research cooperation for technology transfer and innovation for social, economic, and environmental development
Strategy 3	Mobilizing overseas resources and expertise
Strategy 4	Allocating subsidies for research and transferring technology and innovation
Strategy 5	Developing skills, capacities of postgraduate and postdoctoral research students
Strategy 6	Alleviating limitations and obstacles affecting research production
Strategy 7	Promoting and developing research ecosystem and innovation, and developing research personnel in the higher education system
Strategy 8	Developing entrepreneurship
Strategy 9	Sharing of research benefits and intellectual property
Strategy 1	Studying and researching good governance systems and formulate guidelines to promote good governance in higher education institutions
Strategy 2	Disclosing of information to promote good governance in the higher education system
Strategy 3	Assessing good governance of higher education institutions
Strategy 4	Setting up development focus for higher education institutions to benefit national development and global higher education institutions rankings (World University Ranking)
Strategy 5	Developing higher education institutions as education hubs for CLMV countries at regional and international levels (International Hub for Higher Education)
Strategy 6	Reforming financial system for higher education
Strategy 7	Developing digital infrastructure and big data systems for higher education and research

Part

3

Important Driving Forces

3.1 Conformity

Aiming for the development of higher education determined from the critical issues of the policy framework and the strategy for higher education, science, research and innovation 2023 - 2027 by integrating higher education, science, research and innovation in consistent with the 20-Year National Strategy, the master plan under the National Strategy, National Reform Plan (Revised Edition), Interim Master Plan under the National Strategy resulting from the COVID-19 pandemic (2021 - 2022), the Thirteenth National Economic and Social Development Plan (2023 - 2027), Policy of the Minister of Higher Education, Science, Research and Innovation, and relevant policies and plans, that lead to a connection between the higher education, science, research and innovation system, with relevant agencies for driving towards achieving the country's goals.

Conformity between the key issues of the policy framework and the strategy for higher education, science, research and innovation for 2023 - 2027 and the plan for higher education to produce and develop the country's manpower.

Context of the world's important changes External/internal factors	Important issues in MHESI's framework and relevant plans	Important issues appeared in the Strategy of Higher Education Plan
Social aspect • Aging population • Entrepreneurial thinker *Technological aspect* • Globalization and frontier technology • AI and automation combined with global value chains • Need for soft skills *Economic aspect* • Impact of COVID-19 on the labor market • Skill imbalances *Environmental aspect* • Climate change • Environmental degradation *Political aspect* • Political instability	• Develop BCG in agriculture and food, medicine and health, tourism and energy, materials and biochemistry • Develop AI and automation, smart electronics, logistics, food ingredients, EV • Develop the country's logistics and rail systems to connect network to support innovative economic systems • Develop the grassroots economic system and innovation-based economy, including SMEs and IDEs • Prepare for an aging society • Uplift the level of being a low-carbon society • Develop high-performance manpower, future skills, new industry and services • Create new body of knowledge in science, social sciences, humanities, fine arts, and cutting-edge technology	• Human resource development along with the ecological footprint • Development of BCG, agriculture and food, medicine and health, tourism and energy, materials and biochemistry, and upgrading economy level towards circular economy • Encouraging the use of renewable energy or alternative energy • Encouraging the establishment of social services and healthcare • Teaching and learning management in the form of non-degree • Emphasizing on upskilling, reskilling, and new skilling • Emphasis on soft skills and digital literacy development

Context of the world's important changes External/internal factors	Important issues in MHESI's framework and relevant plans	Important issues appeared in the Strategy of Higher Education Plan
Internal Factors *Higher education quality* • Lack of quantitative information/needs of manpower's skills in the labor market • Concentration of researchers and academic works, imbalanced workloads between research and teaching for lecturers *Access to higher education services* *Equality and equity* *Management efficiency* • Efficiency of monitoring/evaluating systems is relatively low • Quality and update of information database system is low *Responding to the changing context* • Dependent on government support (budget and bureaucratic management) bring about sluggish adaptation and development in various dimensions	• Develop infrastructure in the important areas of science, research and innovation • Access to lifelong learning • Become a hub of talent and knowledge	• Promoting work-based learning • Designing curricula consistent with demand-driven and results-oriented workforce • Designing curricula and entrepreneurial thinker training • Upgrading SMEs and IDEs • Promoting education and work consortium • Conducting future labor market needs • Encouraging brain gain and talent mobility • Encouraging establishment of Institute of Research, Development and Innovation • Promoting social engagement and enterprise • Investing in infrastructure in science, research and innovation areas • Access to lifelong learning • Developing towards excellence following higher education institutions' uniqueness • Promoting good governance • Establishing international cooperation agreement

Policy Framework and Strategy for Higher Education, Science, Research and Innovation for 2023 -2027 in relation to the concept of the Higher Education Plan for Thailand's Manpower Production and Development for 2021 - 2027, Revised Version for 2023 - 2027, as per the pyramid figure demonstrated the role of higher education.

The conformity between the above critical issues led to the **formulation of 7 flagship policies and 3 flagship mechanisms** according to priority setting that is consistent with the 4 missions (educational management, research and innovation creation, academic services for society, and preservation of arts and culture) with limited resources available in the higher education system to **focus on driving to achieve concrete results within 3 years (between 2023 - 2025)** based on relevance, effectiveness and efficiency as follows:

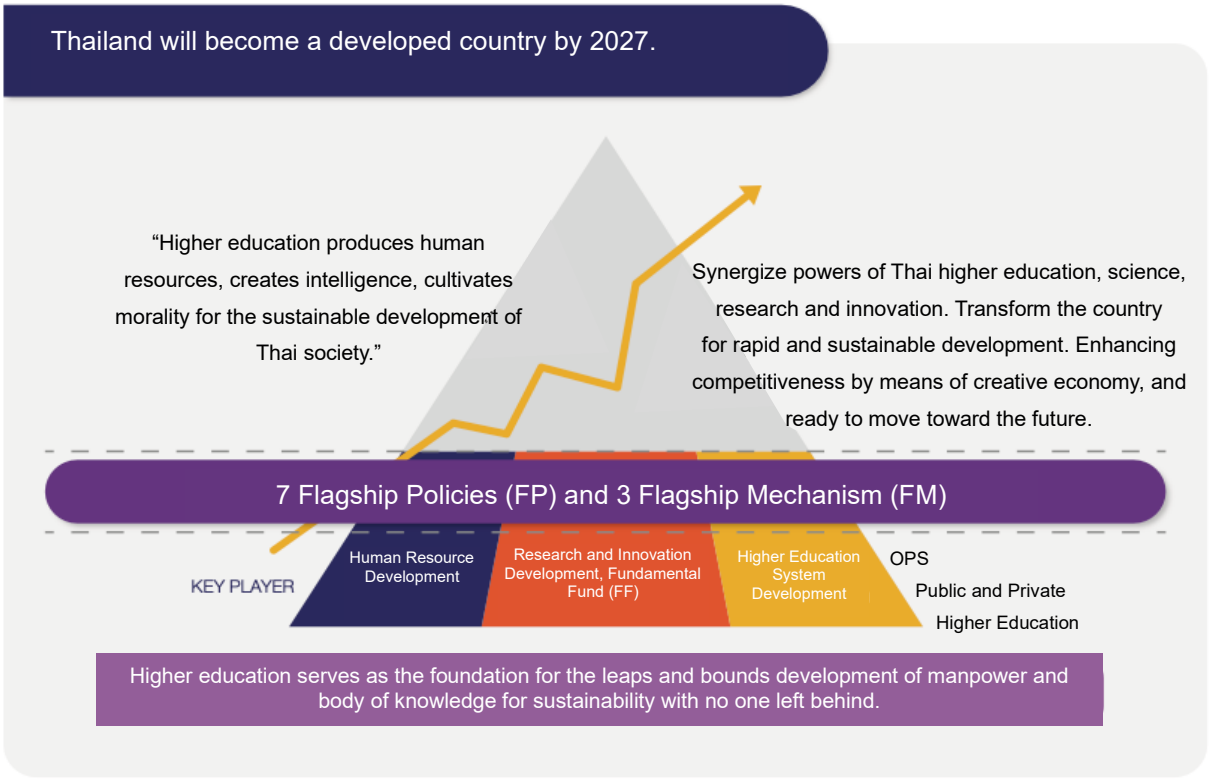


Figure 28 Roles of higher education in synergizing powers of MHESI in driving the national's goals

1. Relevancy: The strategy is formulated in consistent with the main mission of the Ministry of Higher Education, Science, Research and Innovation to respond to the needs of beneficiaries, and essential needs/challenges of the country.

2. Effectiveness: The country's essential challenges are tackled strategically, leading to achieving the goals under the strategy of the higher education plan.

3. Efficiency: Core operations, cooperation, and resource allocation (budget and personnel) are essential contributors to driving strategy, including delivering desired outcomes.

3.2 Flagship policies

FP 1: High-performance and high-potential manpower to meet the needs of industrial development in accordance with the BCG model (agriculture and food; medical and health sciences; tourism and energy including materials and biochemistry; and target industries in accordance with MHESI's Policy and Strategic Framework

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 1, 2, 3, 4, 5, 6, and 13, and Strategy 1, 2 and 4

Tactic 1: The development of higher education foresight and a diagram of the future labor market needs to reduce skills imbalance (skills mapping) and uplift the learners' quality who enter higher education

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; Council of University Presidents of Thailand; Office of the National Higher Education, Science, Research and Innovation Policy Council; Ministry of Education; Ministry of Labor, Ministry of Industry; Board of Investment; Bank of Thailand; agricultural sector; industrial sector; and service sector

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Activity 1

1.1: To formulate policies on graduate production and manpower development according to the field of study in response to the direction of national development.

1.2: To formulate a plan for production, development, and promotion of high-performance and potential manpower production and strategic plans for manpower management.

1.3: To manage the ecosystem of international cooperation that will affect Thailand's MHESI by means of foresight methodology.

Achievement Index 1

- Policy, strategy, and direction in producing graduates and developing the manpower according to the country's needs.
- Plan for producing graduates and developing high-performance and potential manpower and human resources strategic management plan.
- Ecosystem of international cooperation that affects MHESI.

Activity 2 **2.1:** To accelerate data analysis and establish skills mapping that connects and integrates with MHESI's database system. **2.2:** To disseminate skills mapping to higher education institutions and relevant agencies to harness for producing graduates according to users' needs.	**Achievement Index 2** - Information on manpower in the fields of science and social science according to the needs of the labor market.
Activity 3 **3.1:** To organize workshop to brainstorm formulating future skill set and knowledge set for promoting lifelong education in higher education. **3.2:** To support and to promote lifelong education operations in higher education institutions all over the country.	**Achievement Index 3** - Results of formulating future skill set and knowledge set for promoting lifelong education in higher education.
Activity 4 **4.1:** To connect and support body of knowledge and academic services to basic and vocational education to prepare students for entering higher education. **4.2:** To adjust the curriculum to produce competent teachers, to establish a high-competence teacher experiential training process model, that keep up with local, regional and international changes, and to motivate them to firmly observe morality, ethics, and code of conduct for teachers. **4.3:** To devise guidelines for developing the student selection system in higher education institutions in order to alleviate inequality in opportunities for people who cannot afford or are disadvantaged and to promote the development of student competencies.	**Achievement Index 4** - Learners are readily prepared to enter the higher education system. - Continuation from basic, vocational and higher education will be seamless.

Activity 5	Achievement Index 5
5.1: To prepare readiness for talented individuals in science, technology and innovation at the secondary level all over the country. **5.2:** To support educational and research cooperation networks domestically and internationally with higher education institutions and schools to develop potential of manpower in science, technology and innovation. **5.3:** To arrange for the study, research, and development of curricula, learning methods, teaching methods, and evaluation of teaching and learning for talented individuals in science, technology, and innovation at the secondary level.	- Talented individuals in science, technology and innovation at the secondary level.

Tactic 2: Equipping graduates with knowledge and skills and developing the manpower responding to the needs of labor market in consistent with the demand-driven and results-oriented workforce in line with the new higher education philosophy through the education sandbox system

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; Board of Investment; agricultural sector; industrial sector; and service sector

Activity 1 **1.1:** To design/to develop collaborative curricula between higher education institutions and operators to expand process to cover agricultural, industrial, and service sectors all over the country. **1.2:** To certify non-degree short course modules for skill development so that manufacturing sector and operators can benefit incentives from BOI. **1.3:** To devise a system for certifying competencies of manpower for the future (upskilling, reskilling, and new skilling) with non-degree certificate courses, as well as newly developed courses. **1.4:** To develop a new pattern of education management (education sandbox) that integrates multidisciplinary and interdisciplinary knowledge to produce graduates and develop competency of manpower, that will attract investment from modern businesses and industries in science, technology and innovation.	**Achievement Index 1** - Education sandbox system that integrates multidisciplinary and interdisciplinary knowledge. - High-performance and potential graduates and manpower will attract investment from modern businesses and industries (global investment). - Employment and well-being of EEC model type B manpower.
Activity 2 **2.1:** To urge higher education institutions to adjust learning and teaching by means of collaboration between higher education institutions and various sectors, including government, industry, and communities on work-based learning to produce a Next Generation of Higher Education Project. (A New Breed of Graduates Project.). **2.2:** To emphasize on enhancement of soft skills and transversal skills. **2.3:** To adjust higher education standards to be flexible in supporting modification of learning and teaching methods. **2.4:** To create a higher education ecosystem that can increase competencies and skills from learning for people of all ages and all sectors.	**Achievement Index 2** - Next generation of higher education (New breed of graduates) and high performance and competent manpower.

Activity 3	Achievement Index 3
3.1: To accumulate working experience from experiential education, cooperative and work-integrated education. **3.2:** To devise an announcement on the standard framework for curriculum and implementation of CWIE for higher education institutions and operators to use as a guideline for organizing the CWIE curriculum to be standardized and recognized. **3.3:** To develop a system for considering curriculum conformity in higher education (CHE Curriculum Online: CHECO) so that it can be used efficiently to import curriculum information of higher education institutions in the CWIE database completely, accurately, and up-to-date.	- CWIE database (https://cwie.mua.go.th/) will be harnessed by higher education institutions and operators to establish collaboration. - (Draft) CWIE curriculum standards and implementation framework - EEC model type A and CWIE will serve as a model of innovative implementation mechanism that is standardized and recognized.

Activity 4	Achievement Index 4
4.1: To create and develop a database for the modular-based and/or micro-credential system, and the Thailand national credit bank system that provides linkages for higher education institutions system feasibly. **4.2:** To create a platform to support credit transfer that connects higher education institutions.	- Thailand national credit bank system of higher education all over the country is flexible for learners of all ages, allowing all groups of learners to access education without conditions and increasing number of users of the credit bank system. - A platform supporting credit transfer.

Activity 5	Achievement Index 5
5.1: To develop diverse and flexible learning channels appropriate to the needs of learners with individual differences to upgrade manpower skills (upskilling, reskilling, and new skilling).	- Learners have access to education equally and equitably.

Activity 6	Achievement Index 6
6.1: To use data from foresight and skills mapping to determine the direction for graduate production and manpower development in science and social sciences with quantities and characteristics required by the occupation consistent with the labor market needs.	- Proportion of science graduates increased compared to social sciences. - Manpower with skills consistent with the labor needs.

Activity 7	Achievement Index 7
7.1: To manage national development funds to alleviate inequality and to strengthen the social sciences and sciences manpower. **7.2:** To develop scholarship grant conditions/incentives for the new generation to enter the fields of study that the country needs. **7.3:** To create link between education and service in government sector that leads to repayment of student loan fund. **7.4:** To develop database system that can follow up and evaluate application of student loan fund efficiently and systematically.	- Manpower can access education and their skills are developed to respond requirements of labor market and consistent with the country's needs.

Tactic 3: The employment ecosystem of graduates and manpower entering the labor markets in the agricultural, industrial, and service sectors

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; Ministry of Labor; Ministry of Industry; Board of Investment; Bank of Thailand; agricultural sector; industrial sector; and service sector

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Activity 1

1.1: To devise a matching system between manpower's skills/quantities and labor market needs (modernizing employment services) and increase opportunities to access employment information (job positions) (job fair).

1.2: To create cooperation between higher education institutions and operators to formulate wages and benefits accreditation system for employment.

1.3: To promote and support graduates and manpower to return to their hometown to develop their area and community leading to building future, opportunities, income, and being the taproot of the country.

1.4: To raise the efficiency level of the Disability Support Services or DSS unit in university serving as caregivers for disabled people by developing their potential and readiness to work under appropriate environment.

1.5: To integrate relevant agencies to support policy and measures to create employment opportunities for vulnerable groups or people with disabilities to have job according to their potential.

Achievement Index 1

- People affected by the COVID-19 crisis have jobs, decreasing unemployment after the crisis
- Graduates completing their studies enter the labor market in agriculture, industrial, and service sectors

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FP 2: High-level manpower will have the capacity to support new industries and services of the future

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 9 and 12, and Strategy 1, 2, 3 and 4

Tactic 1: Encouraging brain gain and talent mobility to mobilize high-level manpower (instructor, scientist, researcher, innovator, etc.)

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; National Science and Technology Development Agency; Office of National Higher Education Science Research and Innovation Policy Council; Professional and Organizational Development Network of Thailand Higher Education; Ministry of Industry; agricultural sector; industrial sector; and service sector

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Activity 1

1.1: To promote brain gain of researchers, and experts in the fields supporting new industries and services of the future to join the country's education and research system.

1.2: To maintain researchers and experts to remain in the system by providing incentives, career advancement, awards and honors for career achievement.

1.3: To enhance mentors and coach lecturers in higher education institutions by raising level of their knowledge, adding new body of knowledge in sciences and social sciences, competencies, and values as professional specialized in mentoring and coaching at organizational level.

1.4: To share benefits and profits from academic work.

Achievement Index 1

- Instructor, scientist, researcher innovator, etc., join career in the Thai academic communities.
- Academic strength of research personnel.
- Lecturers in higher education institutions are of high quality in delivering professional teaching and learning at level 3 and above.

Activity 2 **2.1:** To upgrade mechanisms, systems, transfer, and exchange of personnel, knowledge, technology, and innovation (talent mobility) between various sectors both domestically and internationally.	**Achievement Index 2** - Body of knowledge, technology, and innovation harnessed by industrial sectors.
Activity 3 **3.1:** To develop platform to promote and support Thai's high-level manpower to go to study, research, or work in the high-potential agency abroad, and facilitate Thai MHESI agencies to recruit high-level personnel from abroad to come to study, research, or work in Thailand.	**Achievement Index 3** - Body of knowledge, technology, and innovation harnessed by industrial sectors.

Tactic 2: Upgrading research units in potential and excellent higher education institutions (University Research Institute: URI) as Government Research Institute (GRI) to enhance the quality of science, technology, and innovation and harness body of knowledge, frontier technology, and innovation for actual utilization

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; National Science and Technology Development Agency; Ministry of Commerce; Higher Education Institutions; agricultural, industrial, and service sectors

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Activity 1

1.1: To develop graduate studies and researchers in science and technology in essential fields (Center of Excellence), and create high-level research to enable the development of academic excellence in the future.

1.2: To produce research, develop cutting-edge technology and innovation, and elevate URI to become apparent GRI.

1.3: To set up standard criteria for fair sharing of rights and benefits from research results to create motivation for researchers, parent organizations, and operators.

1.4: To support research ecosystem with international standards (quality infrastructure) that facilitate large-scale research.

Achievement Index 1

- High-level body of knowledge and graduate-level researchers that transfer body of knowledge and technology to industrial, agricultural, and service sectors.
- GRI's International standards (quality infrastructure).

Tactic 3: Synchronize among other agencies, both public and private sectors, to enable cooperation on investment in manpower and research leading to development of the country and management of new challenges

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; higher education institutions; National Science and Technology Development Agency; Thailand Science Research and Innovation; Office of National Higher Education Science Research and Innovation Policy Council; Ministry of Industry; agricultural, industrial, and service sectors

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Activity 1

1.1: To create a policy-level network platform for academics and researchers to transfer body of knowledge, exchange good practices, and build harmonization both inside and outside the country with MHESI's system to respond to industrial development needs in accordance with the BCG model.

1.2: To organize joint education among higher education institutions, research institutes, and scientific institutes (NARIT/GISTDA/Synchrotron/ NSTDA/NIMT, etc.) in producing scientists, researchers, and innovators at the graduate level.

Achievement Index 1

- Platform for cooperation in transferring body of knowledge and exchanging good practices.
- High-level manpower supporting new industries and services of the future.

FP 3: Community enterprises, grassroot economic systems, innovation-based economies, as well as SMEs, IDEs, and Deep Tech: Start-Ups are strengthened and they are able to create commercial value business

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 7, and Strategy 1 and 4

Tactic 1: Incubate and transfer body of knowledge to entrepreneurs to develop community enterprises, grassroots economic systems, and innovation-based economies, including SMEs and technology-based startups

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; National Science and Technology Development Agency; National Innovation Agency; Ministry of Commerce; Ministry of Industry; agricultural, industrial, and service sectors

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Activity 1

1.1: To promote concepts and motivation leading to business creation (Hackathon).

1.2: To incubate at pre-incubation stage and transfer of body of knowledge related to commercialization and technological innovation.

1.3: To match entrepreneurs and resources (such as budget and body of knowledge) to scale up business to increase its potential.

Achievement Index 1

- New entrepreneurs, technology-based startup.

Tactic 2: Access to infrastructure and services of higher education institutions and research institutes to support technology and innovation, IDEs and Deep Tech: Start Up

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; National Science and Technology Development Agency; Ministry of Commerce; Higher Education Institutions; agricultural, industrial, and service sectors

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Activity 1

1.1: To increase marketing channels including digital platforms and exhibition/trade shows of products and services for entrepreneurs.

1.2: To promote the matching of novel ideas from scientific and technological progress between higher education institutions and private sector in creating innovation or deep technology.

1.3: To promote the potential of new innovative business entrepreneurs between large businesses and universities (business brotherhood) by harnessing body of knowledge from academic works of higher education institutions and science infrastructure such as science parks and research institutes to push for commercial business opportunities to drive private sector in responding to creative integration.

Achievement Index 1

- University holding company upgraded to spin-off company that uses deep technology.
- Original entrepreneurs developed into IDEs and deep tech: start up in the future.
- Entrepreneurs have competitiveness both domestically and internationally.
- Products, innovative works are harnessed for commercial purposes.

FP 4: Complete support of aging society and lifelong learning

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 8, and Strategy 3 and 4

Tactic 1: Improve efficiency of ecosystem to support aging society for self-reliance in aging society

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; Ministry of Public Health; Ministry of Labor; agricultural, industrial, and service sectors

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Activity 1

1.1: To create innovations supporting an aging society, such as services and health care.

Achievement Index 1

- Inventions and innovations to support aging society.

Activity 2

2.1: To enhance skills and knowledge for non-degree courses as caregiver for the elderly.

2.2: To develop learning innovation and educational management formats focusing on taking advantage of technology for learning, such as Thai MOOC that is suitable for all ages.

Achievement Index 2

- Caregivers.
- People from all ages and all age groups can access lifelong learning.
- Manpower is readily prepared for an aging society.
- Elderly people are active citizens.

Activity 3

3.1: To design/to develop curricula and provide education to support the elderly, such as upskilling, reskilling, and new skilling to prepare for an aging society (transversal skills).

3.2: To develop a thoughtful system that changes characteristics of work, which will fit competencies of elderly workers based on the concept of maintaining potential and dignity of elderly workers.

Achievement Index 3

- Elderly people are ready for an aging society.
- Employment system for elderly workers.
- Elderly workers are self-reliance in society.

FP 5: Creating academic excellence in sciences, social sciences, humanities and fine arts

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 10 and 11, and Strategy 3 and 4

FP 6: International hub of talent and knowledge

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 10 and 11, and Strategy 3 and 4

Tactic 1: Promoting academic excellence of higher education institutions including social sciences, humanities, and fine arts at local, regional, and international level (Academy of Social Sciences, Humanities and Arts)

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; Thailand Academy of Social Science, Humanities and Arts; agricultural, industrial, and service sectors

Activity 1	Achievement Index 1
1.1: To support research, creation, and development of intellectual capital, and develop a national intelligence repository. **1.2:** To disseminate essential body of knowledge related to social sciences, humanities, and fine arts. **1.3:** To integrate body of knowledge in social sciences, humanities, and fine arts with body of knowledge in sciences, technology, and innovation. **1.4:** To harness results of studies, research, and development in social sciences, humanities, and fine arts to solve problems and to develop the sustainability of the country. **1.5:** To create cooperation network with domestic and international partners.	- Multidisciplinary and interdisciplinary body of knowledge, which are extremely important to sustainable development by connecting Thailand with regional and international academic communities. - Personnel are excelling in social sciences, humanities, and fine arts.

Tactic 2: Promoting academic excellence of higher education institutions in sciences, technology, and innovation at local, regional, and international levels

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; National Science and Technology Development Agency; agricultural, industrial, and service sectors

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Activity 1

1.1: To create differentiation and diversity according to higher education institutions' mission and potential.

1.2: To evaluate and to develop the quality of higher education institutions systematically and to support development direction according to institution's strategy (control, reduce, terminate inefficient operations).

1.3: To produce academic works/publications in modern agriculture, health science, space economy, quantum technology, etc., that are cited and to create a high economic impact factor to the country.

1.4: To focus on building reputation and recognition by means of upgrading higher education institutions in the university ranking, and university ranking by subject, toward the Asian and global level in the shortest time possible.

Achievement Index 1

- University prominence
- Personnel are excelling in sciences, technology and innovation.

FP 7: Strengthening infrastructure in sciences, technology, and innovation of Thai higher education institutions

Conform with MHESI's Policy and Strategic Framework for 2023 – 2027 in flagship 10 and 11, and Strategy 3 and 4

Tactic 1: Strengthening, connecting, and sharing infrastructure utilization in sciences, technology, and innovation in strong higher education institutions

Synergizing Unit: Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation; Higher Education Institutions; National Science and Technology Development Agency; agricultural, industrial, and service sectors

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Activity 1

1.1: To provide modern research tools and equipment with adequate quality infrastructure by emphasizing on common use of existing resources within the country.

1.2: To transfer and exchange body of knowledge, and experience for researchers by working with multicultural researchers to keep pace with new knowledge, and to build collaboration with internationally recognized research networks.

1.3: To create career stability for researchers throughout their working life adequately.

1.4: To create career paths for graduates for research work in various fields that meet the needs of graduate users.

1.5: To establish criteria for personnel management that facilitate the development of researchers and personnel in higher education institutions to advance in academic tenure and to receive appropriate remuneration.

1.6: To promote the use of intellectual property, including intellectual property registration, protection, management, and utilization.

Achievement Index 1

- Infrastructure in sciences, technology, and innovation in strong higher education institutions.
- Researchers and high-level personnel in higher education institutions.

3.3 Flagship mechanisms

FM 1: Reforming financial and budgetary system based on outcome-oriented

Tactic 1: Developing an integrated budget allocation and management system to aim for efficient productivity and outcomes

Activity 1 **1.1:** To study and research on unit costs that can reflect higher education quality and standards according to expertise, uniqueness, and group or type of higher education institutions. **1.2:** To develop a model that leads to outcome-based budget allocation through demand-side financing according to students and labor market needs. **1.3:** To arrange an agreement on budget allocation with the Budget Bureau to be consistent with the graduate's production and manpower development policy and plan.	**Achievement Index 1** - Trial version of unit cost that reflects quality and standards of higher education. - Outcome-based budget allocation model.
Activity 2 **2.1:** To take advantage of the higher education development fund to develop academic excellence according to the uniqueness and expertise of both public and private higher education institutions, and the production of high-level specialized manpower according to the needs of the country through a flexible and agile multi-year budgeting system, to be able to support the changing process of higher education management quickly to keep up with world changes.	**Achievement Index 2** - Both public and private higher education institutions can take advantage of the higher education development fund cost-effectively and efficiently. - Both public and private higher education institutions can drive missions according to their uniqueness and expertise responding to the country's development direction.

FM 2: Promoting good governance, transparency and accountability

Tactic 1: Promoting, supporting, and honoring the performance by observing the principles of good governance of higher education institutions

Activity 1

1.1: To create a procedure for accessing information/news such as administration and management of education and budget expenditure that reflects transparency and accountability of higher education institutions.

1.2: To set up social measures for higher education institutions that observe/violate the principles of good governance in order that higher education institutions take responsibility for results of their operation, and engage involvement of society to oversee higher education institutions.

Achievement Index 1

- Procedure for accessing information/news.
- Transparency and accountability of higher education institutions.

Activity 2

2.1: To encourage higher education institutions to prepare and disclose good university reports for acknowledgement of the public.

2.2: To assess good governance at level of higher education institutions and administrators from data and indicators related to educational management, budget expenditure, etc.

2.3: To present Good Governance University Awards to higher education institutions committed to performing their duties by strictly observing the principles of good governance.

Achievement Index 2

- Higher education institutions commit to perform their duties by observing the principles of good governance.

FM 3: Upgrading database of the higher education system to be reliable, accurate, precise, and stable

Tactic 1: Developing higher education data verification system and internal and external linking

Activity 1

1.1: To develop a verification system for higher education data cleansing, data verification, and validation.

1.2: To establish cooperation in accessing and linking higher education data between internal and external agencies.

1.3: To develop big data linkage system and data warehouse system, supporting policies on higher education, science, research, and innovation (UniCon) to analyze, synthesize, and evaluate the country's higher education potential and strategic position.

1.4: To serve as main mechanism for evaluating strategies and executives' decision-making in formulating policy for higher education.

Achievement Index 1

- Database system that links among agencies.
- Big data and data warehouse systems supporting policies on higher education, science, research, and innovation.

Part

4

Outcomes and impacts of higher education development on the national goals

4.1 Milestone of the 5-year higher education development 2023 – 2027

Three strategies for developing higher education over 5 years (2023 - 2027) and 10 important driving forces resulting in important events from the development of higher education, that divided into 2 phases as follows:

Phase 1: Higher education is key enabler for Thailand's transformation in the post COVID-19 pandemic

The first three years of development (2023 - 2025) are the years of 10 important driving forces (7 flagship policies and 3 flagship mechanisms) by accelerating the potential enhancement of higher education from the existing resources available in higher education system. They are manpower, body of knowledge, and higher education ecosystem for the purpose of rehabilitating the economy, society, and environment. Each year, there are important milestones as follows:

Milestone I: Manpower of all ages have been developed according to the philosophy of Thai higher education in all dimensions, which is in line with the needs of the agricultural, industrial, and service sectors in 2023.

Milestone II: Ecosystem strength of higher education will lead to pushing forward to the economic and social sectors by 2024.

Milestone III: Hub of international expertise by 2025.

Phase 2: Higher education for sustainable Thailand

Implementation of phase 2 continues for 2 years (2026 - 2027), it is the result of continuous development according to 3 strategies for developing higher education combined with results from 10 important driving forces instigating higher education to have potential resources and can be utilized to its full potential. In this regard, it will enable higher education institutions to create balance in the distribution of benefits from development to all sectors equitably, and to enhance their competitiveness according to the 13th National Economic and Social Development Plan Framework. Each year, there are important milestones as follows:

Milestone IV: Higher education resources will be harnessed to their full potential within 2026.

Milestone V: Higher education developing the Thai economy and society sustainably from knowledge in social sciences and sciences with leaps and bounds research and innovation with no one left behind and becoming developed countries by 2027.

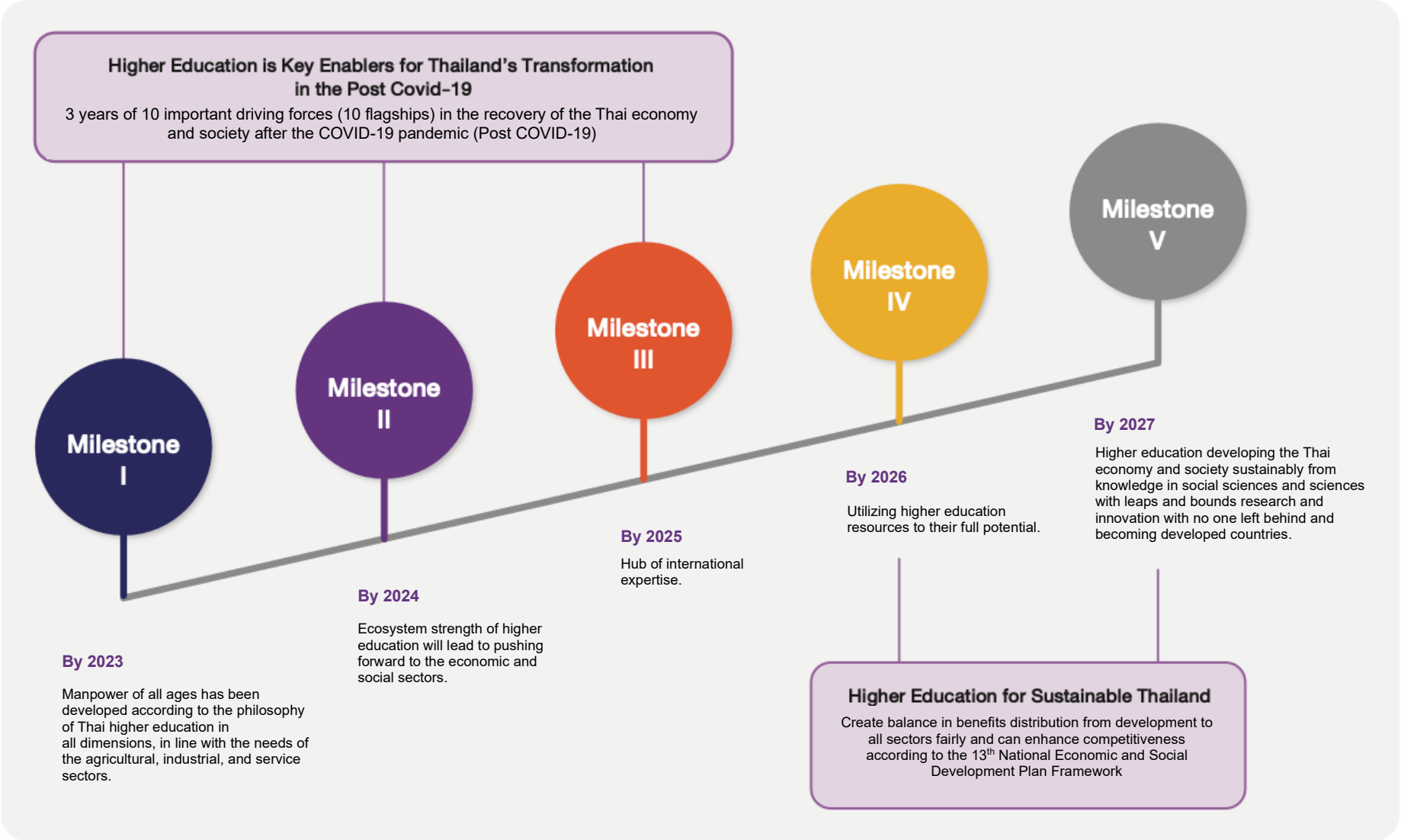


Figure 29 Milestone of the 5-Years Higher Education Development (2023 - 2027)

Milestone I: Manpower of all ages have been developed according to the philosophy of Thai higher education in all dimensions, which is in line with the needs of the agricultural, industrial, and service sectors by 2023

M1.1	Degree students and non-degree manpower are equipped with knowledge, skills, and opportunities to access higher education system
M1.2	Proportion of talented secondary school students in science, technology and innovation entering higher education system has increased
M1.3	Next generation of higher education (New breed of graduates) and manpower with high performance and potential in agricultural, industrial, and service sectors
M1.4	Skilled manpower (future skills and transversal skills) congruent with labor market and the country's needs
M1.5	High-performance, specialized and potential manpower in the Eastern Economic Corridor (EEC) is an innovative mechanism that is standardized and recognized according to the personnel development guidelines required by EEC model type A (degree) and B (non-degree)
M1.6	Proportion of graduates in sciences increases compared to those in social sciences
M1.7	People affected by the COVID-19 pandemic are employed, reducing unemployment rate after the crisis
M1.8	Lecturers, scientists, researchers, innovators, and others have academic strength, and join to work in the Thai academic community
M1.9	Higher education institutions deliver knowledge, technology, and innovation for use in agricultural, industrial, and service sectors
M1.10	Caregivers who help taking care of dependent elderly people to support an aging society
M1.11	All groups of people and all ages have access to lifelong learning, and have a good quality of life and well-being
M1.12	Manpower is readily prepared for an aging society
M1.13	Policies, strategies, and plans for graduate production and manpower development, including strategic management of high-performance, specialized and potential manpower

M1.14	Data of manpower in the field of sciences and social sciences according to the needs of the labor market
M1.15	Results of formulation of future skills set and knowledge set for promoting management of lifelong education at higher education level
M1.16	Platform bridging the gaps between basic, vocational and higher education
M1.17	CWIE curriculum standards and implementation framework
M1.18	Diversity, universal, and equity flexible learning pathways
M1.19	Education sandbox system
M1.20	Platform supporting credit transfer
M1.21	Thailand National Credit Bank System for higher education throughout the country with flexibility for all aged learners, providing opportunities for all learner groups to study without conditions
M1.22	Efficient funding database system and national development funds management
M1.23	Public and private higher education institutions take advantage of the Higher Education Development Fund worthily, efficiently, and effectively
M1.24	Channels for accessing data/information
M1.25	Administration of higher education institutions based on strict observation of good governance principles
M1.26	Big Data and data warehouse systems connecting among agencies to support policies in higher education, science, research and innovation

Milestone II: Ecosystem strength of higher education will lead to pushing forward to the economic and social sectors by 2024	
M2.1	Higher education institutions' lecturers, researchers, and high-level personnel generating academic work, innovation, and frontier technology
M2.2	High-performance and specialized manpower supporting new industries and services of the future
M2.3	Research work recognized, published, disseminated, and cited internationally
M2.4	Excellent personnel in social sciences and sciences
M2.5	Elderly people are active citizens and self-reliance in society
M2.6	CWIE database (https://cwie.mua.go.th/) allows higher education institutions and operators to harness and join collaboration matching
M2.7	Matching system for skills, quantities of manpower and labor market needs
M2.8	Collaborative platform for transferring knowledge and exchanging best practices

Milestone III: Hub of international expertise by 2025

M3.1	High-performance and potential graduates and manpower attract investment from modern businesses and industries (global investment)
M3.2	Increasing number of international students studying in specialized fields of the country
M3.3	Technology-based start-up entrepreneurs
M3.4	Existing entrepreneurs developed into IDEs and deep tech: start-up in the future
M3.5	University holding company upgrading as a spin-off company using deep technology
M3.6	International cooperation ecosystem benefitting MHESI
M3.7	GRI is qualified with international standards (quality infrastructure)
M3.8	Inventions, products, research, and innovations are applied for patents and petty patents as intellectual properties
M3.9	Strong science, technology and innovation infrastructure in higher education institutions
M3.10	Higher education institutions produce outputs according to their mission of excellence that matches their uniqueness and expertise

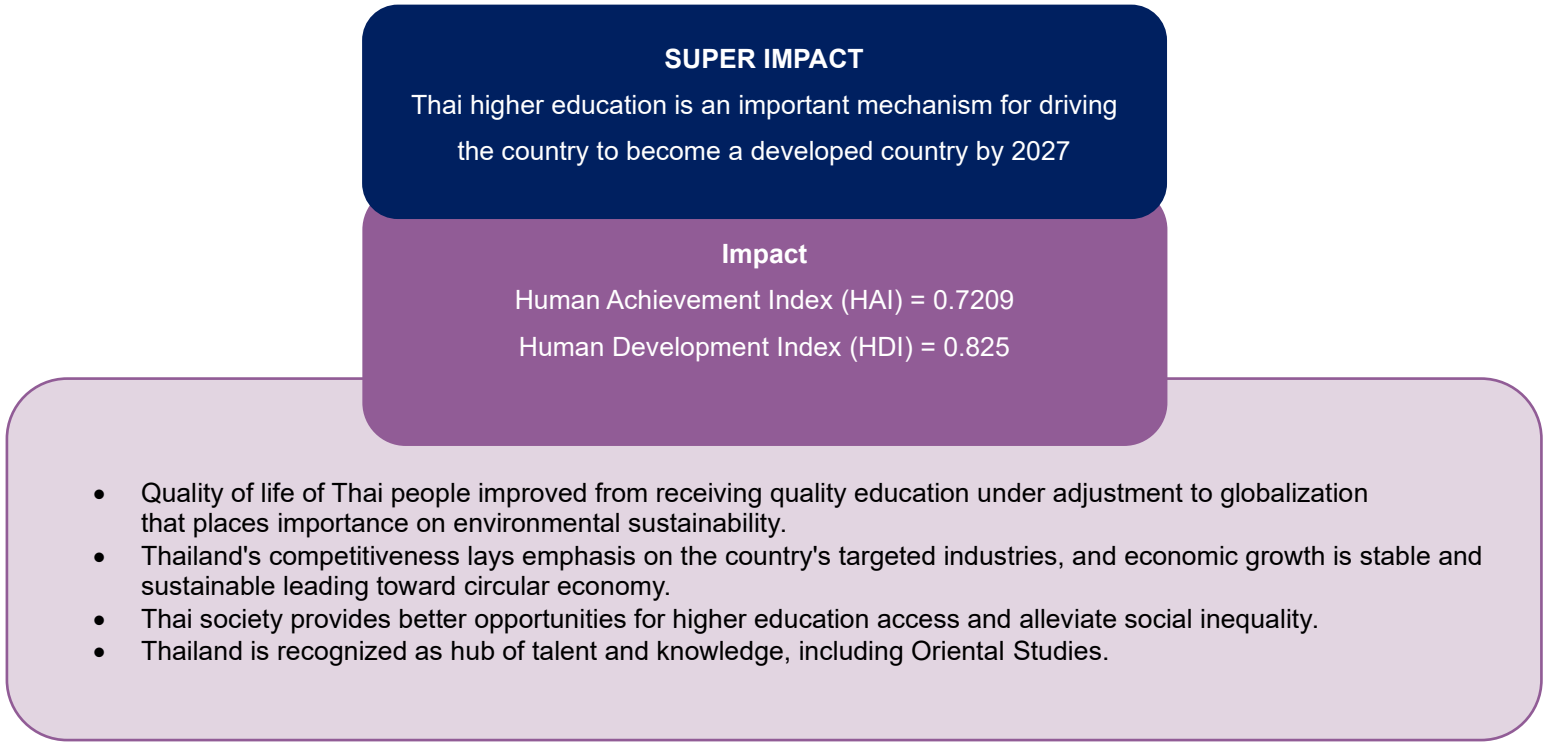
Milestone IV: Higher education resources will be harnessed to their full potential within 2026

M4.1	Learners in the system (age group) and manpower outside the system (non-age group) are aware of sustainability, climate change, and circular economy, therefore, they modify the way of production and consumption accordingly
M4.2	Multidisciplinary and interdisciplinary knowledge is essential for sustainable development through connecting Thailand with the region and international
M4.3	Knowledge, innovation and cutting-edge technology are transferred to agricultural, industrial, and service sectors
M4.4	Cultural area safeguarded by means of problem-solving and development in social sciences, humanities, and fine arts
M4.5	Management and utilization of intellectual property, including sharing benefits fairly
M4.6	Trial version unit cost and outcome-based budget allocation reflecting quality and standards of higher education
M4.7	Higher education institutions benefit from services of information technology networks to develop effective education and lifelong learning through digital technology
M4.8	Enhancing economy and community at sub-district level by heeding needs of local people in developing their livelihoods and creating new careers; together with community services by applying body of knowledge in building creative economy to provide environmental support toward circular economy

Milestone V:	**Higher education developing the Thai economy and society sustainably from knowledge in social sciences and sciences with leaps and bounds research and innovation with no one left behind and becoming developed country by 2027**

M5.1	Competitiveness of operators domestically and internationally
M5.2	Higher education institutions are in the world's top 100 University Ranking by Subjects
M5.3	Higher education institutions ranked in the top 200 of the World Class University Ranking
M5.4	Products and innovations harnessed commercially
M5.5	Inventions and innovations supporting aging society

4.2 Diagram of outcomes and impacts of higher education development on the national goals



VISION '2027'

"Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society"

OUTCOME 1	OUTCOME 2	OUTCOME 3
1.1 Higher education system covers lifelong learning. The development mechanism is flexible and ready to adapt to the globalization trends that give importance to environmental sustainability. 1.2 All groups of people have access to quality education equally and equitably without obstacles and live happily. The elderly become active citizens. 1.3 Graduates in science, technology, engineering, and mathematics (STEM degrees) have multidisciplinary and interdisciplinary skills. 1.4 Manpower has required competencies and characteristics that correspond to the new philosophy of higher education. They are able to utilize their professional and academic competencies and reduce unemployment rate. 1.5 Manpower with high competency and potential/high level of specialization according to the country's important development goals, attracting foreign investment. 1.6 Higher education has academic strength in sciences, social sciences, and Oriental Studies. 1.7 Quality of lecturers/academic personnel have been enhanced, and their standards are internationally recognized (Scopus). 1.8 Experts from public and private sectors from domestic and international countries support academic work.	2.1 The proportion of lecturers, scientists, researchers, and innovators compared to the population has significantly increased. 2.2 The number of external experts from various domestic and international sectors who transmit knowledge and skills in higher education institutions and research institutes/centers significantly increased. 2.3 Knowledge and academic works have been published and cited by international academic institutions, creating economic value. 2.4 Entrepreneurs develop their skills and benefits from the higher education ecosystem, able to compete in the domestic and international markets. 2.5 Entrepreneurs develop into IDEs and deep tech, new industries, and services of the future.	3.1 Higher education institutions partner in higher education, cutting-edge research at regional and international levels. 3.2 Higher education institutions are hubs of talent at the international level in social sciences, humanities, fine arts, sciences, technology, and innovation. 3.3 Thai higher education institutions are ranked higher in the international ranking agencies. 3.4 Higher education institutions' management system is efficient and produces outcomes for the country at every level according to the reinventing universities framework. 3.5 System/mechanism/law, management, quality, and standards inspection and control for flexible higher education management consistent with the uniqueness of each group of higher education institutions. 3.6 Digital higher education system supports teaching and learning, research, and information searching from stable databases and reflects transparency according to the principles of good governance.

4.3 Monitoring and evaluation

1) Linking planning and expenditures of the annual budget

The linking of planning and expenditures of the annual budget determines the integrated relationship between higher education investment and expected outcomes that the institution will deliver each year (such as a number of full-time students classified by fields of study under ISCED classification which is characterized by advanced planning or pre-auditing according to the institution's potential. This linking goes on for 4 - 5 years as multi-year budgeting, in which the Higher Education Commission will primarily consider its suitability based on the potential and achievements of each institution that responds to the country's needs.

2) Reporting annual achievement

Higher education institutions will submit annual achievement reports through a single platform database system based on the same statistical standards of the National Higher Education Statistics Systems for the benefit of planning, inspection, and evaluation as stipulated by the Higher Education Commission to regulate such operations. The government will be responsible for overseeing, expediting, following up, and arranging evaluation of the implementation in accordance with the higher education plan, expenditures of public higher education institution’s budget under the Ministry’s jurisdiction. The annual implementation results following the higher education plan will be reported to the Council of Ministers and the Policy Council on an annual basis.

3) Evaluating plan and budget after operations (Post Audit)

Considering the linking of planning and expenditures of the annual budget, even though it is scrutinized every cycle of 4 - 5 years, it has to be reviewed annually to determine whether the outputs are in accordance with the plan. If outputs were as planned, the budgeting process would proceed normally, but in the case where outputs do not follow the Higher Education Commission's plan, there is a need to review expenditures of an annual budget framework for next year, or there may be an adjustment to the implementation plans as the case may be.

4) Formulating monitoring and evaluation

The formulation of monitoring and evaluation is to set parameters for quantifying output, outcome, and impact of higher education development on the national goals as follows.

- Monitoring and evaluating budget expenditures for higher education of the public higher education institutions in accordance with the flagship policies and mechanisms is carried out annually.

- Monitoring and evaluation of performances of public higher education institutions is carried out annually by focusing on developmental evaluation in accordance with the five phases of Milestone 5. They are Milestone I by 2023, Milestone II by 2024, Milestone III by 2025, Milestone IV by 2026, and Milestone V by 2027.

- Monitoring and evaluation of 30 indicators of 3 strategies for higher education development, divided into 2 phases. They are the half-plan phase for reviewing, improving and developing of achievements of the plan and the end-plan phase to evaluate the success of potential development of the entire higher education systems, these include outcomes and impacts on the country that benefited from such development.

- Reporting results of monitoring and evaluation to the Higher Education Commission and the National Council for Higher Education, Science, Research and Innovation Policy, including reflecting the evaluation results to the responsible agencies.

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Appendix

Definition

Principles of defining high-level manpower

• **Manpower** refers to "**a group of people who can be the country's labor force (workforce). They are aged 15 years and above, which is the age that can enter the labor market, up to 60 years. It is a working-age population.** It also includes the elderly population, aged 60 years and above, with strengths, skills, and experiences that can add value for society."

• **Intellectual Capital (Brainpower)**: general characteristics are shrewd; expert; exceptionally intelligent; able to think, develop, and solve problems with accrued experiences systematically.

• **Highly Skilled Manpower:** general characteristics are people equipped with intelligence, skills, and exceptional wisdom. These people have the knowledge and skills to do complex work and can adapt quickly to technological change. They are able to apply knowledge creatively and have specialized skills to create, develop, disseminate, and apply a body of knowledge (Institute of Labour Science and Social Affairs and International Labour Organization, 2014). **They are classified according to 3 characteristics** that highly skilled manpower shall have all 3 characteristics or any of them as follows.

1. High Competency/High Performance: general characteristics are people who have or are developed with skills, knowledge, capacities, including enriching physical behaviors, mental characteristics and attitudes up to the specialized professional level that they can perform according to their high-level expertise or academic work in study and research to develop the body of knowledge and society efficiently and effectively that is consistent with the national development goals which are in line with the goals of MHESI's Policy and Strategic Framework for 2023 - 2027, that is, people with high performance, who can create high-level labor productivity.

2. High Potential: general characteristics are people with high efficiency, high capacity, motivation and aspire to rise to more senior and important positions.

3. Educated Worker/ Educated Manpower: general characteristics are those completed higher education. They are creative and able to invent, innovate, design innovations and initiate new perspectives that are beneficial to tackle challenges, solve problems systematically, and transfer concepts methodically and precisely (Office for Teaching & Learning WAYNE State University, 2021).

Principles of defining multidisciplinary and interdisciplinary

• **Multidisciplinary curriculum** refers to "a curriculum consisting of various fields combining in such a way that each course can be independent of the other."

• **Interdisciplinary curriculum** refers to "a curriculum consisting of various fields integrating harmoniously to form a new science, department or field of study."

Principles of defining quality of professional teaching and learning of lecturers

• **Quality of professional teaching and learning of lecturers (The Professional Standards Framework: PSF)** refers to the role of lecturers' expertise in teaching and learning that focuses on learning outcomes standards to develop essential skills and knowledge of learners in the 21st century (21st Century Skills) to have lifelong learning proficiency. The standards consist of 3 components: knowledge, competencies, and values. There are four quality levels as follows.

Level 1 recounts lecturers who know and understand their sciences and can apply them. They have thorough knowledge and understanding of basic learning science and are able to design activities, organize learning atmospheres, and use resources and media by taking into account learners and factors affecting their learning. They are able to measure and evaluate students' learning outcomes, use the evaluation results to improve and develop learning management, develop themselves continuously, be open to relevant parties' opinions and observe professional ethics for lecturers of their organizations.

Level 2 recounts lecturers whose attributes beyond level 1 with more profound knowledge and regularly keep tracking advancement of the field of their knowledge. They have thorough knowledge and understanding of learning sciences, manage learning appropriately for the group of learners. They supervise and follow up on students' learning outcomes systematically. They can advise and guide fellow lecturers in the fields of their specialization and promote compliance with professional ethics for lecturers within the organization.

Level 3 recounts lecturers with attributes beyond level 2, who are specialized in their disciplines, as well as specialized in learning sciences, and cross-disciplinary learning management. They can use classroom research results to develop learning management. They serve as a coach and guide at organization level in learning management and policy on professional ethics for lecturers.

Level 4 recounts lecturers with level 3, who are leaders in their disciplines, learning sciences, and cross-disciplinary learning management. They are recognized both inside and outside of the organization, participating in formulation of policies and strategies for body of knowledge development and learning management at the national and international levels, as well as leaders in policy on professional ethics for lecturers.

Higher Education, Science, Research and Innovation Policy and Strategic Framework for 2023 - 2027 (MHESI's Policy and Strategic Framework)

Flagship plans based on policy focus

1) Developing and producing COVID-19 vaccine and becoming a center for vaccines at the ASEAN level with the goal that Thailand can develop and produce its own COVID-19 vaccine within 2 years and come to be a center for vaccines at the ASEAN level within 5 years.

2) Developing advanced therapy medicinal products industry to be number one in ASEAN with the goal that Thailand come to be number one in ASEAN in the advanced therapy medicinal products industry within 5 years.

3) Developing and enhancing tourism using the creative economy concept by emphasizing value-added, creating sustainability, increasing national income, and increasing proportion of high-quality tourists and revisiting with the following goals.

- Proportion of revisiting high-quality tourists traveling in Thailand will increase significantly within 5 years.
- Income from tourism based on the creative economy and BCG economy will increase, and distribution of tourists to secondary cities, communities, as well as small entrepreneurs will be increased significantly within 5 years.

4) Augmenting production and export levels of functional ingredients, functional food, and novel food to create high economic value and Thailand comes to be the world's leading production and export center with the goal that Thailand is the world's leading production and export center for functional ingredients, functional food, and novel food with the highest economic value, ranking in top 10 of the world.

5) Accelerating development of production and export of high-value Thai food and fruits for Thailand to become a world leader by adding economic value and increasing ordering countries with the goal that Thailand come to be the world leader in the production and export of high-value Thai food and fruits. Its economic value will be increased, and number of ordering countries will increase doubly.

6) Accelerating development of electric vehicle industry, focusing on batteries and important parts that are advanced and cutting-edge technology, turning the country into EV car production base for ASEAN with the goal that Thailand is the largest producer in ASEAN in electric vehicle industry, especially assembly of advanced and cutting-edge batteries and important parts within 5 years.

7) Developing and encouraging the country to step up large-scale innovation-driven enterprise: IDE with the goal that Thailand establish IDE with revenues of one billion baht per year, increasing number up to 1,000 enterprises.

8) Increasing potential and opportunities for the elderly, and bringing about the elderly self-reliance in the country, creating value to the society in higher proportion with the goal that Thai elderly will be self-reliant and add value to society. The proportion will be significantly increased within 5 years.

9) Developing advanced and cutting-edge technology and innovation into the future and developing space technology extending towards space industry in the future, including building satellites to be sent to explore the moon with the goal that Thailand can build satellites for research and development by Thai people and sent it to explore around the moon within 6 years.

10) Developing to become the Talent Hub of ASEAN, with the goal that Thailand will become the Talent Hub of ASEAN within 5 years.

11) Developing to become a Knowledge Hub of ASEAN, including Oriental Studies, with the goal that Thailand will be a Knowledge Hub of ASEAN, including Oriental Studies within 5 years.

12) Producing and developing specialized high-performance manpower that responds to the urgent needs of the country's target industry goals and future development and to be consistent with the new Thai higher education philosophy **by transforming the lifelong learning system and collaborating with the industrial and international partners.** The goal is that Thailand will have specialized high-performance manpower that responds to all needs of targeted industries urgently and for future developments. Implementation of the plan will be carried out consistent with the new Thai higher education philosophy by transforming the lifelong learning systems and collaboration with industrial and international partners within 5 years.

13) Developing manpower produced by higher education system to have morality and ethics as necessary desirable characteristics together with high professional and academic competencies with the goal that all manpower produced by higher education system will have morality and ethics as necessary desirable characteristics together with high professional and academic competencies within 5 years.

Subcommittee on Policy and Planning

Announcement of the Higher Education Commission on April 29, 2021 and November 22, 2021

Yamnoon, S.

Chairman of the subcommittee

Reutrakul, V., Prof.

Subcommittee Member

Tekasakul, P., Prof.

Subcommittee Member

Pathumnakul, S., Prof.

Subcommittee Member

Chairoj, S., Prof.

Subcommittee Member

Bhumiratana, S., Assoc. Prof.

Subcommittee Member

Sriratanaban, J., Assoc. Prof.
Subcommittee Member

Punyasavatsut, C., Assoc. Prof.
Subcommittee Member

Mongkolnavin, R., Assoc. Prof.
Subcommittee Member

Charoenpornpattana, S., Asst. Prof.
Subcommittee Member

Puttanapong, N., Assoc. Prof.
Subcommittee Member

Wanichkorn, K.
Subcommittee Member

Chantaronanon, P.
Subcommittee Member

Panyatawegitpisan, N.
Director of Strategy and Planning Division
Subcommittee Member and Secretary

Working Team

Advisor

Professor Sirirurg Songsivilai, M.D., Ph.D.	Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation
Professor Supachai Pathumnakul	Deputy Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation
Mr. Nikom Panyatawegitpisan	Director of Strategy and Planning Department

Data Analysis and Content Organization

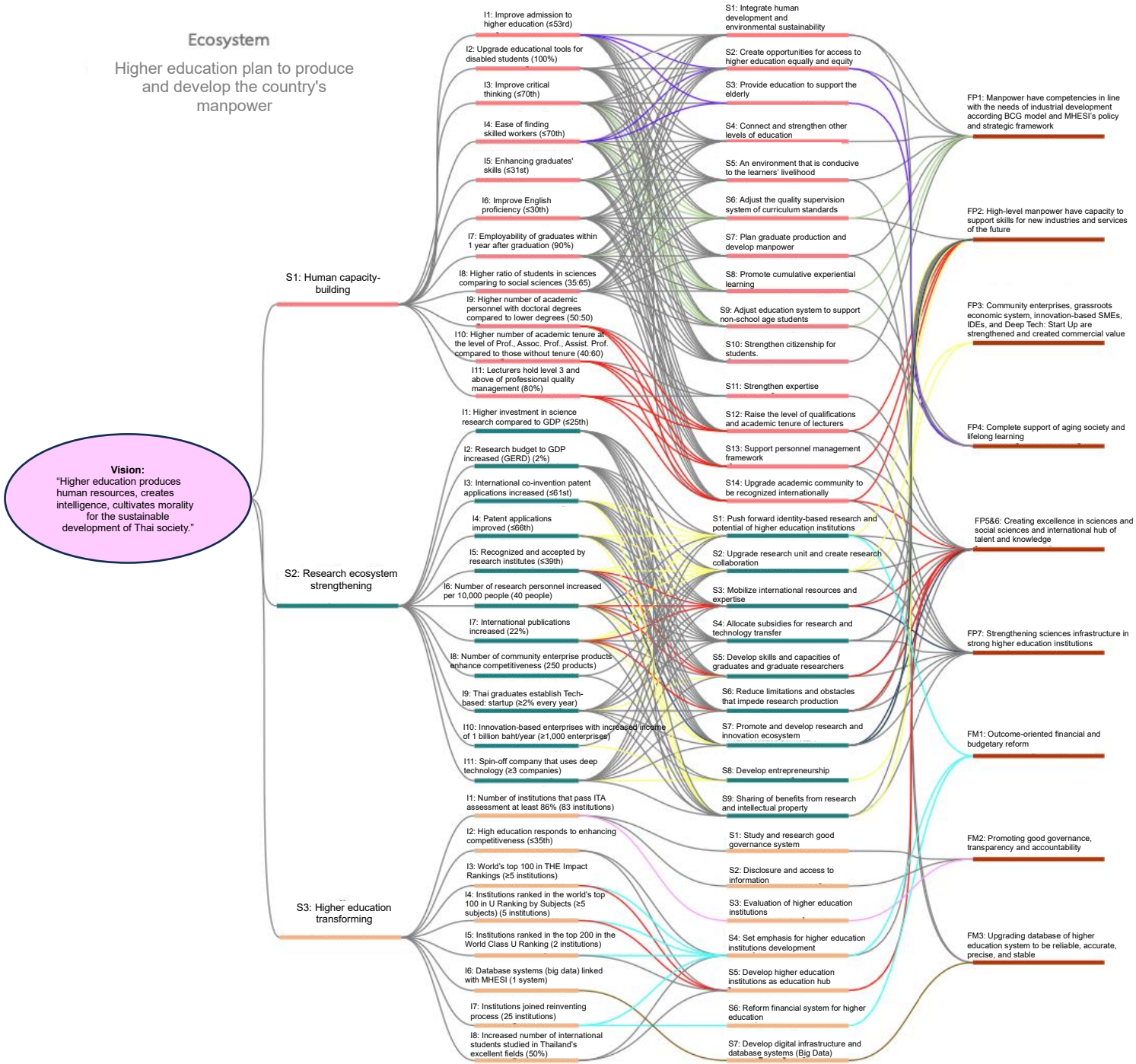
Mr. Chuckkrit Limpisatien	Director of Higher Education Policy and Planning Division
Miss Inthivorn Buajampa	Plan and Policy Analyst, Professional Level
Miss Nampetch Chathep	Plan and Policy Analyst, Professional Level
Miss Punika Polamporn	Plan and Policy Analyst, Professional Level

Data Collection

Miss Piyamaporn Rodbang	Plan and Policy Analyst, Professional Level
Mrs. Paweena Rattanatunyakuln	Plan and Policy Analyst, Professional Level
Miss Pattama Ouppapong	Plan and Policy Analyst, Professional Level
Miss Wipada Phromsri	Plan and Policy Analyst, Professional Level
Miss Nunnalin Hengruai	Plan and Policy Analyst, Professional Level
Mr. Chayanin Chaiyapan	Plan and Policy Analyst
Miss Wiyaporn Subsuwan	Plan and Policy Analyst

Organized by
Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation
Higher Education Policy and Planning Department, Strategy and Planning Division
No. 75/47, King Mongkut's Building, 5th Floor, Soi Yothi, Rama 6 Road,
Thung Phaya Thai, Ratchathewi District, Bangkok 10400
Tel. 0 2333 3860
Email hiedplan@mhesi.go.th

Design and Printing
Parbpim Printing Company Limited
45/12-14, 33 Moo 4, Bang Kruai-Jong Thanom Road, Bang Khanun Subdistrict, Bang Kruai District, Nonthaburi Province, 11130


Ecosystem
Higher education plan to produce and develop the country's manpower
Vision:
"Higher education produces human resources, creates intelligence, cultivates morality for the sustainable development of Thai society."
S1: Human capacity-building
S2: Research ecosystem strengthening
S3: Higher education transforming
I1: Improve admission to higher education (≤53rd)
I2: Upgrade educational tools for disabled students (100%)
I3: Improve critical thinking (≤70th)
I4: Ease of finding skilled workers (≤70th)
I5: Enhancing graduates' skills (≤31st)
I6: Improve English proficiency (≤30th)
I7: Employability of graduates within 1 year after graduation (90%)
I8: Higher ratio of students in sciences comparing to social sciences (35:65)
I9: Higher number of academic personnel with doctoral degrees compared to lower degrees (50:50)
I10: Higher number of academic tenure at the level of Prof., Assoc. Prof., Assist. Prof. compared to those without tenure (40:60)
I11: Lecturers hold level 3 and above of professional quality management (80%)
I1: Higher investment in science research compared to GDP (≤25th)
I2: Research budget to GDP increased (GERD) (2%)
I3: International co-invention patent applications increased (≤61st)
I4: Patent applications improved (≤66th)
I5: Recognized and accepted by research institutes (≤39th)
I6: Number of research personnel increased per 10,000 people (40 people)
I7: International publications increased (22%)
I8: Number of community enterprise products enhance competitiveness (250 products)
I9: Thai graduates establish Tech-based: startup (≥2% every year)
I10: Innovation-based enterprises with increased income of 1 billion baht/year (≥1,000 enterprises)
I11: Spin-off company that uses deep technology (≥3 companies)
I1: Number of institutions that pass ITA assessment at least 86% (83 institutions)
I2: High education responds to enhancing competitiveness (≤35th)
I3: World's top 100 in THE Impact Rankings (≥5 institutions)
I4: Institutions ranked in the world's top 100 in U Ranking by Subjects (≥5 subjects) (5 institutions)
I5: Institutions ranked in the top 200 in the World Class U Ranking (2 institutions)
I6: Database systems (big data) linked with MHESI (1 system)
I7: Institutions joined reinventing process (25 institutions)
I8: Increased number of international students studied in Thailand's excellent fields (50%)
S1: Integrate human development and environmental sustainability
S2: Create opportunities for access to higher education equally and equity
S3: Provide education to support the elderly
S4: Connect and strengthen other levels of education
S5: An environment that is conducive to the learners' livelihood
S6: Adjust the quality supervision system of curriculum standards
S7: Plan graduate production and develop manpower
S8: Promote cumulative experiential learning
S9: Adjust education system to support non-school age students
S10: Strengthen citizenship for students.
S11: Strengthen expertise
S12: Raise the level of qualifications and academic tenure of lecturers
S13: Support personnel management framework
S14: Upgrade academic community to be recognized internationally
S1: Push forward identity-based research and potential of higher education institutions
S2: Upgrade research unit and create research collaboration
S3: Mobilize international resources and expertise
S4: Allocate subsidies for research and technology transfer
S5: Develop skills and capacities of graduates and graduate researchers
S6: Reduce limitations and obstacles that impede research production
S7: Promote and develop research and innovation ecosystem
S8: Develop entrepreneurship
S9: Sharing of benefits from research and intellectual property
S1: Study and research good governance system
S2: Disclosure and access to information
S3: Evaluation of higher education institutions
S4: Set emphasis for higher education institutions development
S5: Develop higher education institutions as education hub
S6: Reform financial system for higher education
S7: Develop digital infrastructure and database systems (Big Data)
FP1: Manpower have competencies in line with the needs of industrial development according BCG model and MHESI's policy and strategic framework
FP2: High-level manpower have capacity to support skills for new industries and services of the future
FP3: Community enterprises, grassroots economic system, innovation-based SMEs, IDEs, and Deep Tech: Start Up are strengthened and created commercial value
FP4: Complete support of aging society and lifelong learning
FP5&6: Creating excellence in sciences and social sciences and international hub of talent and knowledge
FP7: Strengthening sciences infrastructure in strong higher education institutions
FM1: Outcome-oriented financial and budgetary reform
FM2: Promoting good governance, transparency and accountability
FM3: Upgrading database of higher education system to be reliable, accurate, precise, and stable

Higher Education Plan
for Thailand's Manpower Production and Development
(2021-2027)

Revised Version for 2023-2027

Strategy and Planning Division
Office of the Permanent Secretary, Ministry of Higher Education, Science, Research and Innovation
No. 75/47 Phra Chom Klao District,
Rama 6 Road, Thung Phaya Thai Subdistrict, Ratchathewi District,
Bangkok, 10400
Tel. 0 2333 3860
Email hiedplan@mhesi.go.th