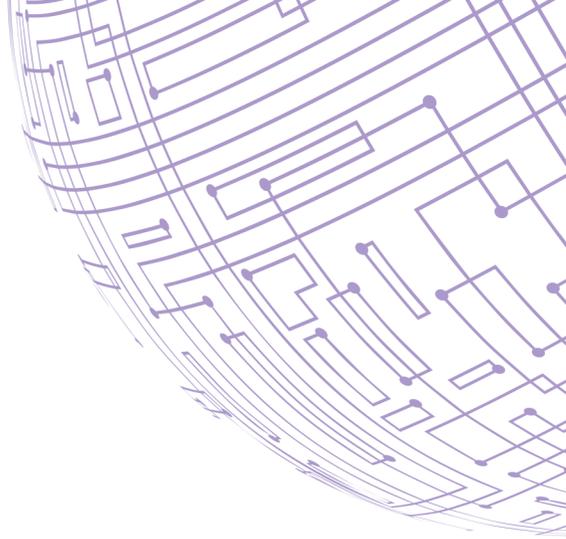




# **Study and Development of Soft Skills and Digital Skills to Support Future Development**





**Conducted under the project for a study and development of soft skills  
and digital skills to support future development  
Office of the National Digital Economy and Society Commission (ONDE)**

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A stylized, light blue graphic of a circuit board or network diagram, showing various lines, nodes, and rectangular components, positioned in the upper left corner of the page.

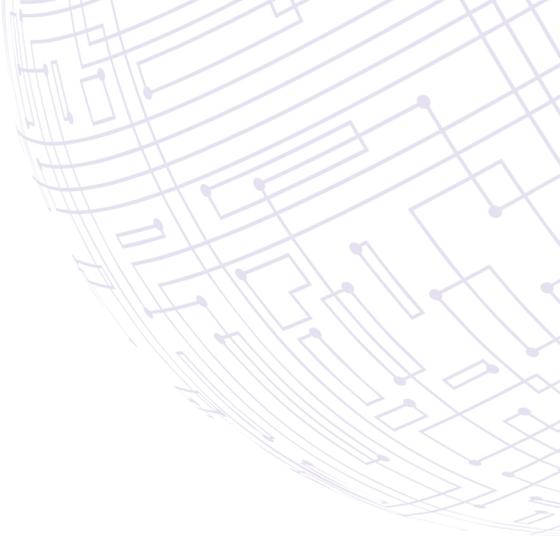
# **Study and Development of Soft Skills and Digital Skills to Support Future Development**

**The Office of the National Digital Economy  
and Society Commission (ONDE), Thailand**

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Study and Development of Soft Skills and Digital Skills  
to Support Future Development



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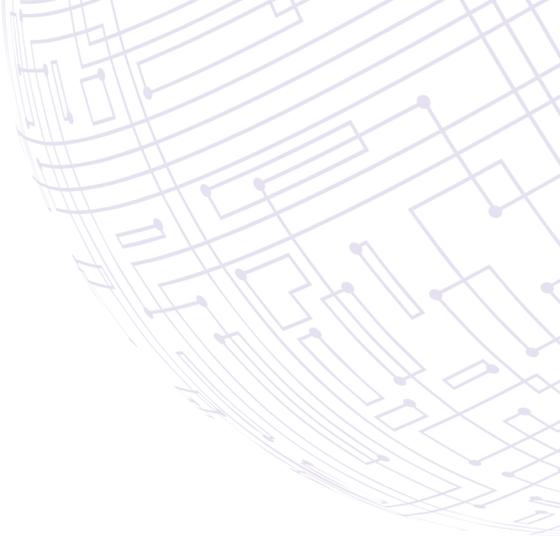
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# PREFACE

Digital Transformation refers to the integration of digital technology into an organization to change processes, create business value, or provide new customer experiences. This enables organizations to quickly and efficiently respond to changes and market demands. Digital transformation is not just about implementing digital technology within an organization; it requires the development of skills within the workforce to adapt to various changes. The development of skills can be achieved in three forms: creating new skills necessary for work (Reskill), upgrading existing skills (Upskill), and learning new necessary skills (New Skill). Skill development for the workforce to support the transition to digital is not limited to digital skills alone. This is because the issues that arise during the transition to digital are not limited to technical or digital aspects. Key issues that need to be managed or addressed during this process depend on the soft skills of the personnel in the organization. The Office of the National Digital Economy and Society Commission (ONDE) recognizes the necessity of defining the essential soft skills, specifying core skills and sub-skills, and mapping the soft skills required for Artificial Intelligence (AI) in order to bridge professional skills with the necessary soft skills in the ASEAN region. In this regard, ONDE has also developed courses to develop soft skills that are essential for working in this era of digital transformation, to support future development, and plans to navigate artificial intelligence to support the transition to digital, and to promote the economy and enhance the country's competitiveness at both the ASEAN and global levels as well.



# EXECUTIVE SUMMARY

This pocket book is a part of the project on the study and development of Soft Skills and Digital Skills to support future development within the framework of international collaboration. It is a component of the project recognized at the 1st ASEAN Digital Senior Officials' Meeting (ADGSOM) held in January 2021. The project aims to support workforce development by fostering the creation of new skills (Reskill), upgrading existing skills (Upskill), and learning new necessary skills (New Skill) under the strategic thrust of the ASEAN Digital Master Plan 2025 (ADM 2025), focusing on the transition to digital systems (Digital Transformation).

## Global and ASEAN Trends in Soft Skills

Soft skills are internal behaviors, including emotional characteristics, feelings, perspectives on self-worth, motivation, attitudes, beliefs, virtues, molded into one's personality and image. It involves using the heart in working towards success, requiring continuous development processes and motivation, and utilizing qualitative assessments.

## Trends in Future Occupations

The Future of Jobs Report 2023, compiled by the World Economic Forum, predicts the trends of new professions and professions that are expected to decrease or be replaced. This prediction is based on four variables: (1) Five-year Trend, (2) Skill Importance, (3) Skill Evolution, and (4) Reskilling Focus. The survey reveals a surge in digital technology-related professions in the next five years, spanning artificial intelligence, machine learning, robotics, big data analysis, data security, blockchain systems, electronic business management, and digital marketing. While digital skills are crucial, the workforce's success within organizations necessitates the development of essential soft skills like communication, teamwork, leadership, and lifelong learning, fostering effective collaboration and adaptability to technological changes.

## Crucial Soft Skills

The results of reviewing literatures and related research on the essential and crucial soft skills, considering their benefits, feasibility, and appropriateness, can be summarized as follows.

### Definition of Soft Skills, Core Skills and Sub-Skills

Soft skills can be defined as 'skills within individuals and between individuals that are necessary for personal development, coexistence, social participation, and success in the workplace, including the development of society and the world.' Individual soft skills are those embedded within an individual through upbringing, education, and environmental influences that shape values, motivation, self-perception, and perspectives. Interpersonal or social interaction skills are the relationships between individuals or social interactions influenced by mutual perceptions, group interactions, and the cultural and social environment affecting human behavior. The relationship between humans and the environment can be categorized into three systems: the microsystem surrounding the individual (e.g., family, community, religious institutions), the mesosystem involving interactions between elements around the individual (e.g., interactions among groups in society), and the macrosystem encompassing the overall social and cultural system (e.g., economic system, legal system).

### Core Skills and Sub-Skills of Soft Skills

From the study, it is found that ASEAN should define soft skills to support the transition to digital and new professions in the future. Additionally, it is necessary to link soft skills to the improvement of the ICT professional skill standards in each occupation, specifying the required level of soft skills. This report proposes five essential soft skills for transitioning to the digital era, including (1) Leadership, (2) Growth Mindset, (3) Emotional Intelligence, (4) Lifelong Learning, and (5) Teamwork. Each core skill comprises various sub-skills, totaling 21 sub-skills.

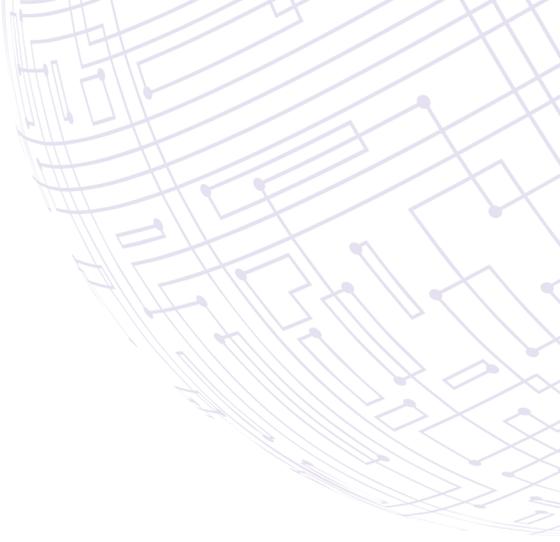
## Revising the ICT Professional Skill Standards for ASEAN in 11 Occupations.

The Office of the National Digital Economy and Society Commission (ONDE) has been developing the ICT professional skill standards since the year 2012 with the aim to support the labor market in the private sector and the international labor market. As these skill standards will assist in reducing obstacles in labor mobility, ONDE has pushed for the standards to be accepted by ASEAN member countries. Currently, there are certified ICT professional skill standards for 11 occupations. After studying and verifying the alignment of these standards with the international standards, it was found that the 11 ICT professional skill standards still align with the specified standards. Therefore, there is no need for an adjustment to the ICT professional skill standards. The study found that the definitions of the ability levels in the specified skill standards include necessary soft skills for ICT professionals. Therefore, the current update of the ICT professional skill standards involves linking the five essential soft skills with the ICT professional skills.

### Artificial Intelligence Roadmap

Since 2012, the Office of the National Digital Economy and Society Commission (ONDE) has been developing ICT professional skill standards to support the private sector and international labor market. These standards aim to ease labor mobility obstacles and gain acceptance among ASEAN member countries. Currently, there are certified standards for 11 occupations, which, upon review, align well with international standards. No adjustments are needed. The study indicates that the defined ability levels encompass essential soft skills for ICT professionals. Therefore, the improvement of the IT professional skill standards in this round is linked to the five essential soft skills. The objectives of this effort are to:

1. Promote the development of AI talent.
2. Foster and support individuals in the labor market to learn and develop both existing (upskilling) and new skills (reskilling).
3. Establish a Credit Bank for IT professional skills for AI talent.
4. Promote ethical guidelines and trustworthy AI.
5. Encourage organizations, both public and private, to apply AI in their operations.
6. Support the recruitment of AI talent with capabilities from abroad to work in Thailand.



# INTRODUCTION

## Motivation

The ASEAN Digital Master Plan 2025, set in 2025 B.E. (2025 AD), envisions ASEAN as a leading digital community and dynamic economic group powered by digital services, technologies, and secure environmental systems. With five strategic thrusts, the second focuses on transitioning to digital transformation. This involves integrating digital technology into organizations to alter processes, create business value, and enhance customer experiences, enabling swift responses to changes and market demands.

The digital transition goes beyond technology implementation; it requires developing workforce skills for quick adaptation to changes and market demands. Digital transformation mandates not only adopting technologies but also emphasizing workforce skill development for efficient responses. This transition involves three skill development approaches: reskilling, upskilling, and acquiring new skills.

Reskilling creates new skills for the evolving work landscape, upskilling elevates existing skills, and acquiring new skills involves learning for the digital era. Workforce development for the organizational digital transition extends beyond digital skills. Studies from Harvard and MIT stress that transitioning to digital encompasses not just technical aspects but also relies on various non-technical elements, including problem-solving using employees' soft skills. The Future of Jobs 2023 report underscores the increasing importance of soft skills like creative thinking, analytical thinking, lifelong learning, and flexibility for the workforce in the next five years.

These studies highlight the significance of soft skills in the digital transition, urging the establishment of precise definitions for essential soft skills. This includes defining core and sub-skills within the soft skills group, and enhancing ICT skill standards to align them with requisite soft skills. The report stems from the "Study on Crucial Soft Skills Required in Digital Transformation" project, approved for international cooperation at the 1st ASEAN Digital Senior Officials' Meeting in January 2024.

## Objective

The objectives of this report are as follows:

- 1.To study global trends in soft skills and digital skills under the international and regional collaboration framework.
- 2.To develop soft skills for the digital era, supporting the future development and growth of the ASEAN region.
- 3.To promote the development and exchange of knowledge and standard skills in ICT professions for artificial intelligence within the ASEAN economic community.
- 4.To create curricula, content, and online learning materials for soft skills in Thailand.

## Results of the study project for the development of ICT skills and future skills preparation for the workforce in ASEAN in the past period

This report has studied and reviewed the results of the project to develop ICT skills and future readiness skills for the workforce in ASEAN over the past four phases. The aim was to develop and improve the ICT professional skill standards for ASEAN. The project involved setting skill definitions and a comparative table of standards for all 11 professions. For each skill, standards were established at three levels:

Level 1 (Basic Level) means having basic knowledge and professional skills sufficient to perform tasks assigned under the supervision of management.

Level 2 (Intermediate Level) means having knowledge and professional skills to perform assigned tasks independently, guide and advise others, understand differences in managing problems in their field, and apply them efficiently when necessary.

Level 3 (Advanced Level) means having knowledge and professional skills in both technical and managerial aspects, lacking only in experience within the workforce group.

The details of the completed project are as follows:

**Phase 1:** Ran from the year 2012 to 2013. The project involved studying and developing skill definitions and ability levels for ICT professional skill standards for ASEAN. Five groups were addressed:

- Software Development
- ICT Project Management
- Enterprise Architecture Design
- Network and System Administration
- Information System and Network Security

**Phase 2:** Executed during the years 2014 to 2015. The project focused on reviewing and improving ICT professional skill standards to align with changing circumstances. Two additional groups were studied:

- Cloud Computing
- Mobile Computing

**Phase 3:** Concluded in the year 2018. It involved refining the ICT professional skill standards studied in Phases 1 and 2. Additionally, three more groups were addressed:

- Big Data
- Social Business
- Internet of Things (IoT)

**Phase 4:** Completed in the year 2021. This phase aimed to review the ICT professional skill standards developed in Phases 1 to 3. It also studied technology trends in ICT and added one more group:

- Artificial Intelligence (AI)

**Phase 5:** Conducted in the year 2023. This phase focused on studying and developing skill definitions for soft skills. The study considered global soft skills trends with a specific focus on ASEAN. It reviewed existing soft skill standards in both public and private sectors and developed five necessary soft skills standards.

## The framework and study methodology of this project

### Soft skills

1. Study trends in soft skills based on studies conducted by various organizations globally.
2. Review documents and research related to soft skills using the systematic review method.
3. Consider selection criteria adapted from Scriven (1969), including utility, feasibility, and propriety, for reviewing documents related to soft skills.
4. Apply Slavin's qualitative criteria by content analysis, summarizing key keywords. Use the aggregated scores of keyword frequencies, ranked from high to low, to consider essential soft skills. Then, use the main keywords to provide detailed explanations that are both structurally and contextually relevant to each soft skill.
5. Use Bloom's cognitive taxonomy framework, consisting of the Buddhist moral aspect, psychomotor skills, and affective domain, to lead to (1) defining learning objectives or goals, (2) developing teaching and skill development activities, and (3) measuring and evaluating outcomes.

### Artificial Intelligence

1. Study policies and guidelines driving artificial intelligence technology globally, with a focus on leading countries such as the United States, Japan, and Singapore.
2. Examine trends in the use of artificial intelligence technology worldwide in various dimensions, including research, economic impact, education, workforce, and ethical considerations.
3. Study the professional IT skills standards for artificial intelligence developed by the Office of the National Science and Technology Development Agency (ONDE), recognized within ASEAN member countries.
4. Examine policies, master plans, and relevant projects related to Thailand's artificial intelligence technology.
5. Develop an artificial intelligence roadmap aligned with global, ASEAN, and national technology trends.
6. Conduct practical workshops to disseminate, listen, and exchange ideas with stakeholders involved in artificial intelligence technology.
7. Collaborate with relevant government.

## **Revising ICT Professional Skill Standards**

1. Study the ICT Skill Standards developed by the ONDE, which have been accepted in ASEAN member countries, comprising 11 groups.
2. Examine trends in artificial intelligence technology in all dimensions, including workforce, requirements, and economic impacts, on a global, ASEAN, and national level.
3. Study and compare ONDE's ICT professional skill standards with global standards.
4. Explore soft skills essential in the digital era.
5. Enhance ICT professional skill standards by linking professional skills with essential soft skills in the digital age.
6. Conduct practical workshops for dissemination, listening, and exchanging ideas regarding the revision of ICT professional skill standards, involving relevant personnel at both the national and ASEAN levels.
7. Improve ICT professional skill standards based on feedback and recommendations obtained from practical workshops.





**Study Results  
of Essential  
Soft Skills in  
the Digital Era**

# GLOBAL AND ASEAN TRENDS IN SOFT SKILLS

The prediction of trends in the future under the changes in digital technology and industrial reform in the digital era, multifactorial factors including the context of geopolitics, economy, society, and global environment have impacted both the world and the East Asian region unavoidably. For instance, the uncertainty of international politics, manifested by the increasing polarization in political realms, has direct and indirect effects on the political, economic, and social dimensions of the East Asian region.

The challenges of growth and inflation, raw material shortages, energy costs, and rising food prices have led central banks worldwide to implement contractionary monetary policies. This involves controlling the inflationary pressures by regulating the prices of goods and services that are on the rise. This has implications for many countries, affecting both highly indebted public sectors and various private sector branches, which must contend with the challenges of business volatility and interest rate fluctuations. These factors contribute to economic growth constraints and the growth of the Gross Domestic Product (GDP), potentially leading to economic downturns in several nations.

Regarding the social aspects, the demographic challenges of the labor force in ASEAN member countries present diverse issues, especially in countries like the Philippines, Cambodia, Myanmar, Vietnam, Laos, Indonesia, Malaysia, and Brunei. These countries have a high proportion of young populations entering the workforce, posing challenges such as attracting and integrating new skilled labor into supply chains to support ongoing economic growth. Additionally, the aging populations in countries like Thailand and Singapore, where a significant proportion of the population is elderly, pose challenges in terms of workforce attraction and the integration of new skills into the supply chain to support future economic growth. Addressing these challenges requires efficient policy, educational, and management measures to prevent and mitigate the impact on the quality of life for citizens and to ensure sustainable development in the 21st century.

The trends and developments in digital technology have implications for the development of soft skills and digital skills to support future development. This includes:

1. Development of innovation platforms and new technology platforms that efficiently support diverse work activities.
2. Platform engineering systems to create value from wireless technology realization.
3. Organizational architecture and environmental systems for digitally distributed organizations powered by blockchain and Web 3.0 technologies.
4. Certification, verification, and confirmation of digital evidence through innovative digital technology systems replacing traditional encoding systems.
5. Computation: Innovative digital technology development to support data analysis using computational methods, computer science, programming languages, algorithms, complex systems, and various artificial intelligence (AI) systems.
6. Interfaces: Development of innovative digital technology to connect digital systems with user interfaces, responding to human usage more effectively and supporting experiences such as virtual reality or collaborative work between computers and users.
7. Digital Immune System: Development of innovative digital technology, operating systems, and digital processes to maintain digital security for computer networks and various end-user devices.
8. Sustainability: Development of sustainable digital technology innovations that are environmentally friendly, energy-saving, and use alternative energy sources.

In the digital age, the significance of "soft skills," encompassing emotional traits, values, and ethics that influence behavior, becomes crucial for individual working potential. Particularly vital in business success, continuous development and motivation are essential to cultivate these skills. This direction in human capital development drives sustainable economic and digital societal progress, improving quality of life and global competitiveness. Aligned with the ASEAN Digital Masterplan 2025, it supports international collaboration, emphasizing reskilling, upskilling, and new skills to meet future digital workforce demands.

# TRENDS IN FUTURE OCCUPATIONS

The World Economic Forum (WEF, 2023) has compiled the Future of Jobs Report 2023 Insight Report, released in June 2023. The report is based on a survey aimed at predicting the future workforce landscape in response to technology and information trends. The survey involved 803 companies employing over 11.3 million people, covering 18 occupational groups from 27 industries and 45 economic regions worldwide. The findings explore the global and technological trends impacting jobs and soft skills, projecting changes in demand for various occupational groups from 2023 to 2030.

Occupations with Increasing Demand	VS	Occupations with Decreasing Demand
 <b>AI Experts and Machine Learning Specialists</b>	1	<b>Banking Staff and Related Positions</b> 
 <b>Sustainability Experts</b>	2	<b>Postal Workers and Service Personnel</b> 
 <b>Business Data Analysts</b>	3	<b>Collectors and Ticket Sales Staff</b> 
 <b>Data Security Analyst</b>	4	<b>Data Entry Officer</b> 
 <b>Financial Technology Engineer</b>	5	<b>Administrative Secretary and Executives</b> 
 <b>Data Analysts and Scientists</b>	6	<b>Storekeeper and Inventory Management</b> 
 <b>Robotics Engineer</b>	7	<b>Accountant and Payroll Staff</b> 
 <b>Database and Network Specialist</b>	8	<b>Bar Association Members and Officials</b> 
 <b>Agricultural Equipment Entrepreneur</b>	9	<b>Financial and Insurance Statistics Officers</b> 
 <b>Digital Systems Expert</b>	10	<b>Door-to-door Sales Representative</b> 

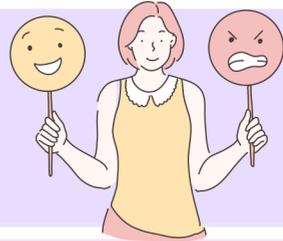
Source WEF, 2023

# TRENDS OF SOFT SKILLS IN THE FUTURE

The World Economic Forum (WEF, 2023) has also predicted soft skills for the future as follows:

## 1. COGNITIVE SKILLS

- 1.1 Analytical Thinking
- 1.2 Creativity
- 1.3 Systems Thinking
- 1.4 Reading, Writing, and Mathematics
- 1.5 Multilingual Communication



## 2. COLLABORATION SKILLS

- 2.1 Service and Customer Service Orientation
- 2.2 Marketing and Media

## 3. ETHICS

- 3.1 Environmental stewardship
- 3.2 Global citizenship



## 4. MANAGEMENT SKILLS



## 4. MANAGEMENT SKILLS

- 4.1 Quality Control
- 4.2 Team Resource Management
- 4.3 Resource and Operations Management

## 5. PHYSICAL FITNESS SKILLS

- 5.1 Flexibility, Endurance, and Precision
- 5.2 Agility and Dexterity



## 6. SELF-AWARENESS SKILLS

- 6.1 Flexibility, Adaptability, and Adjustability
- 6.2 Motivation and Self-awareness
- 6.3 Curiosity and Lifelong Learning
- 6.4 Reliability and Attention to Detail



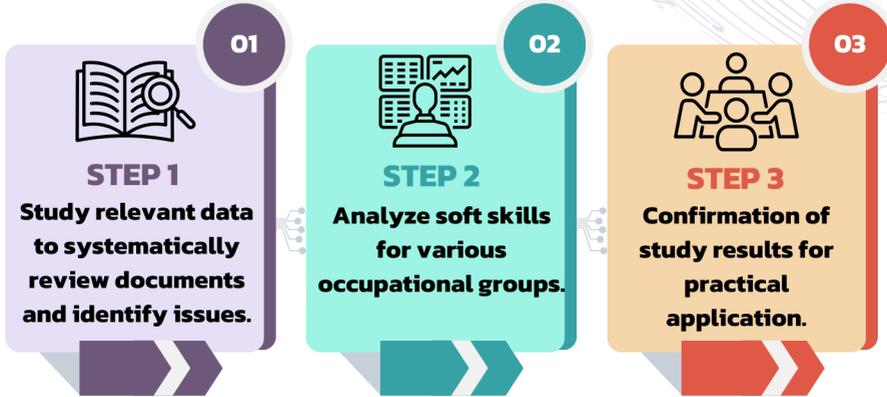
## 7. COLLABORATIVE TEAMWORK

- 7.1 Empathy and Active Listening
- 7.2 Social Leadership and Influence
- 7.3 Teaching and Mentorship



# METHODOLOGY OF SOFT SKILLS STUDY

The process of developing soft skills to support future development involves using a qualitative research method and verifying information for validity and reliability through the Triangulation Technique (Patton, 1999, 2001). The process consists of three steps as follows:



**Step 1:** Study relevant information to identify issues through construction by Systematic Reviews. This involves:

1. Systematic review of documents, knowledge, theories, and related research.
  - a. Focusing on the soft skills dimension based on the definition of soft skills, including the intrapersonal and interpersonal dimensions.
  - b. Examining the competitiveness of human resources skills, reskilling and upskilling related to soft skills on a global level, referencing sources such as GTCI, WEF, UNESCO, and Thailand's direction
2. Analyzing content to determine the main and sub-soft skills and defining the terms used in the soft skills group
3. Validating and confirming data with five experts in labor, human resources, customer management, and education and development through in-depth interviews.
4. Refining the study results, defining the meaning of soft skills, including the main and sub-skills, and specifying the terms within the soft skills group.

**Step 2: Analyze soft skills for various professions with the following steps:**

1. Analyze the interconnection of professional groups to design soft skills. This involves matching soft skills to the content related to:
  - a. Situations, policies, and trends in Thailand, aligned with the National 20-Year Strategy (2018–2037) in various aspects.
  - b. Global trends based on Sustainable Development Goals (SDGs), encompassing 17 goals.
  - c. Vision, goals, policies, and plans at the national level for digital development in the economy and society (2018–2037).
2. Conduct content analysis based on the five factors (Makos, 2013) using a PEST analysis framework: P – Political: Policy and political factors, E – Economic: Business and economic factors, S – Social: Societal factors, and T – Technology: Technological and innovation factors
3. Analyze the interconnection of PEST analysis with professional groups using a framework that considers the roles and responsibilities of each profession. This includes various professions such as agriculture, trading, manufacturing, hospitality services, construction, public administration, transportation, education, other services, and health.
4. Interpret and discuss the findings through a panel discussion involving representatives from ASEAN member countries, government agencies, educational institutions, private sectors, and civil society organizations in Thailand. This aims to discuss and provide insights into the soft and digital skills needed for various professions in the future.

**Step 3: Confirming research results for practical application with the following steps:**

1. Define soft skill levels (main and sub-skills) to guide development, categorizing them into three levels: Basic, Intermediate, and Advanced. Evaluate using Bloom's Taxonomy.
2. Offer suggestions for practical application through a Panel Discussion involving representatives from:
  - ASEAN member countries in the Southeast Asian region.
  - Government agencies related to professional standards, development capacity, and labor force.
  - Educational institutions producing workforce in ICT and other relevant soft skills.
  - Private sector organizations requiring workforce in ICT and other related fields.
  - Professional associations related to ICT, workforce development, and labor improvement.
3. Assess and suggest improvements for soft skill levels (main and sub-skills) for practical use through group discussions. This involves presenting evaluative comments from experts, including educational institutions, the Digital Economy Promotion Agency, the Ministry of Culture, the Ministry of Social Development and Human Security, the Digital Economy Promotion Agency, the National Innovation Agency, and private companies involved in human resource development.

# STUDY OF DEFINITION OF SOFT SKILLS

The social science framework specifies that 'society is a collective existence of humans as a group.' It consists of the structure, social status, and roles. It follows the guidelines of living together in the form of regulations or laws and involves ethical principles to assist and support each other. Humans live together harmoniously in a society according to the framework of related disciplines such as sociology and behavioral science.

## **Intrapersonal Skills**

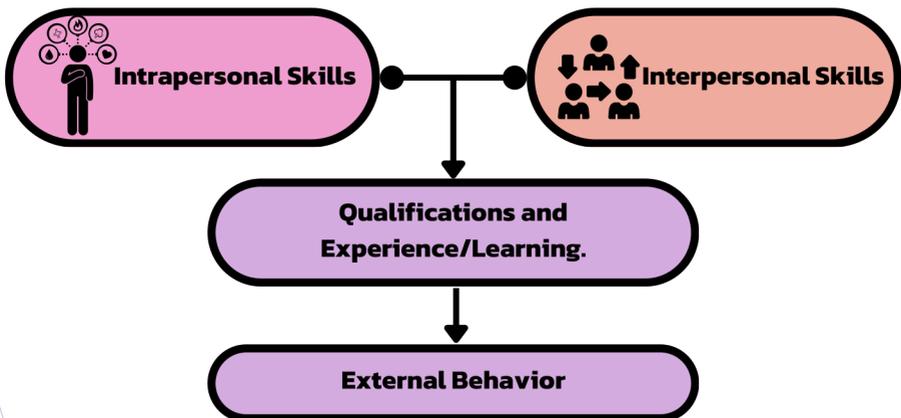
Soft skills are inherent in individuals, shaped by upbringing, education, and training, as well as influenced by society and the environment, contributing to one's values, motivations, and perspectives. The personality may manifest as external behaviors (expressions) and internal behaviors (such as emotions, feelings, and perceptions). Personal development continues throughout life and is crucial for social relationships and interactions with others in society. The development of soft skills is influenced by theories like the personality theory of Sigmund Freud, who highlighted the diversity of adult personalities resulting from childhood experiences. The first five years of life are particularly significant, dividing the human mind into three levels: conscious, pre-conscious, and unconscious. Furthermore, Freud also mentioned that humans carry with them a soul from birth, dividing it into two types: life instincts and death instincts. Some instincts are stored in the unconscious as internal driving forces, energies that compel us to live, create, and seek happiness and satisfaction. Freud asserted that some aspects of the soul are repressed in the unconscious. This internal drive includes a desire for life, creativity, and love, as well as sexual and emotional impulses, all aimed at achieving happiness and satisfaction. Erik Erikson developed the psychosocial development of individuals based on life stages, known as "Psychosocial Development," consisting of eight stages (Erikson, 1966). The life development of individuals at every age is influenced by the society in which children live, particularly by those playing parental roles, siblings, peers, both in the workplace and in their living environment. This influence contributes to creating warmth, emotional stability, and fosters good relationships between individuals.

Human life development, according to this perspective, involves stages from birth to death. Jean Piaget's theory of intellectual development in China emphasizes the interplay of genetics and the environment, incorporating the processes of perception and movement, the connection of thoughts, concrete and abstract thinking, and adult-like conceptual thinking (cited in Lall and Lall, 1983). Lawrence Kohlberg's Moral Development Theory (cited in Woolfolk, 2016) states that human moral behavior progresses through stages, namely, the Premoral stage in early childhood before formal education, where right and wrong depend on clear, visible outcomes. This stage involves guidance and instruction. The Conventional stage, occurring during adolescence, is characterized by adherence to various rules and regulations, relying more on external guidance than independent thinking. Finally, the Principled stage in adulthood allows individuals to autonomously establish broad-ranging moral principles beneficial to society.

### Interpersonal skills or social relationship skills

Urie Bronfenbrenner's Ecological Model (1979) emphasizes the link between humans and their environment, categorizing interactions into three systems: Micro-system (immediate surroundings), Meso-system (interactions among elements in the environment), and Macro-system (broader societal and cultural systems). These systems play a crucial role in shaping how individuals navigate life and communicate in the digital age.

### Origin and Framework of Soft Skills.



The provided text discusses soft skills as the potential of individuals, originating from two dimensions: the intrapersonal dimension (Intrapersonal) and the interpersonal dimension (Interpersonal). Intrapersonal skills include personal characteristics, roles, intellectual and problem-solving skills, emotional skills, and learning and development skills. On the other hand, interpersonal skills encompass social interaction skills, teamwork skills, collaboration skills, and digital communication skills. These skills align with the future direction of work, as highlighted by the World Economic Forum (2023) in the Future of Jobs Report. The study emphasizes the need for both "digital" and "human" skills, including hard skills in the job and soft skills such as emotional intelligence, personality traits, or character that contribute to positive interactions with society and the environment. This is essential for achieving work goals and sustained happiness (UNESCO, 2018).

# DEFINITION OF SOFT SKILLS

From the scope of studying soft skills, it can be summarized that soft skills are defined as follows:

## SOFT SKILLS

Soft skills are the Intrapersonal and interpersonal skills necessary for personal development, collaboration, social participation, and success in the workplace, as well as the development of society and the world.



## 1 INTRAPERSONAL SKILLS

Soft skills, rooted in individuals, stem from upbringing, education, training, and societal influence. Shaped by values and motivations, these skills reflect one's personality, expressed through external and internal behaviors, evolving throughout life.



## 2 INTERPERSONAL SKILLS

The connection between humans and the environment, organized into systems:

1. Micro-system: Immediate surroundings with direct interactions.
2. Meso-system: Interactions among various elements in the individual's environment.
3. Macro-system: Broader societal and cultural systems encompassing all others.



## SOFT SKILLS RELATED TO OCCUPATIONAL GROUPS

After analyzing 11 occupational groups in Thailand based on their roles and responsibilities, the following groups were identified:

Agriculture 	Wholesale 	Production 
Hotel service provider 	Construction work 	Government administration 
Transportation 	Education 	Other services 
Health 	ICT 	

And then interpreting based on the issue of soft skills, using the external factor analysis framework PEST (LE) Analysis, it is found that the essential soft skills for all 11 occupational groups are"



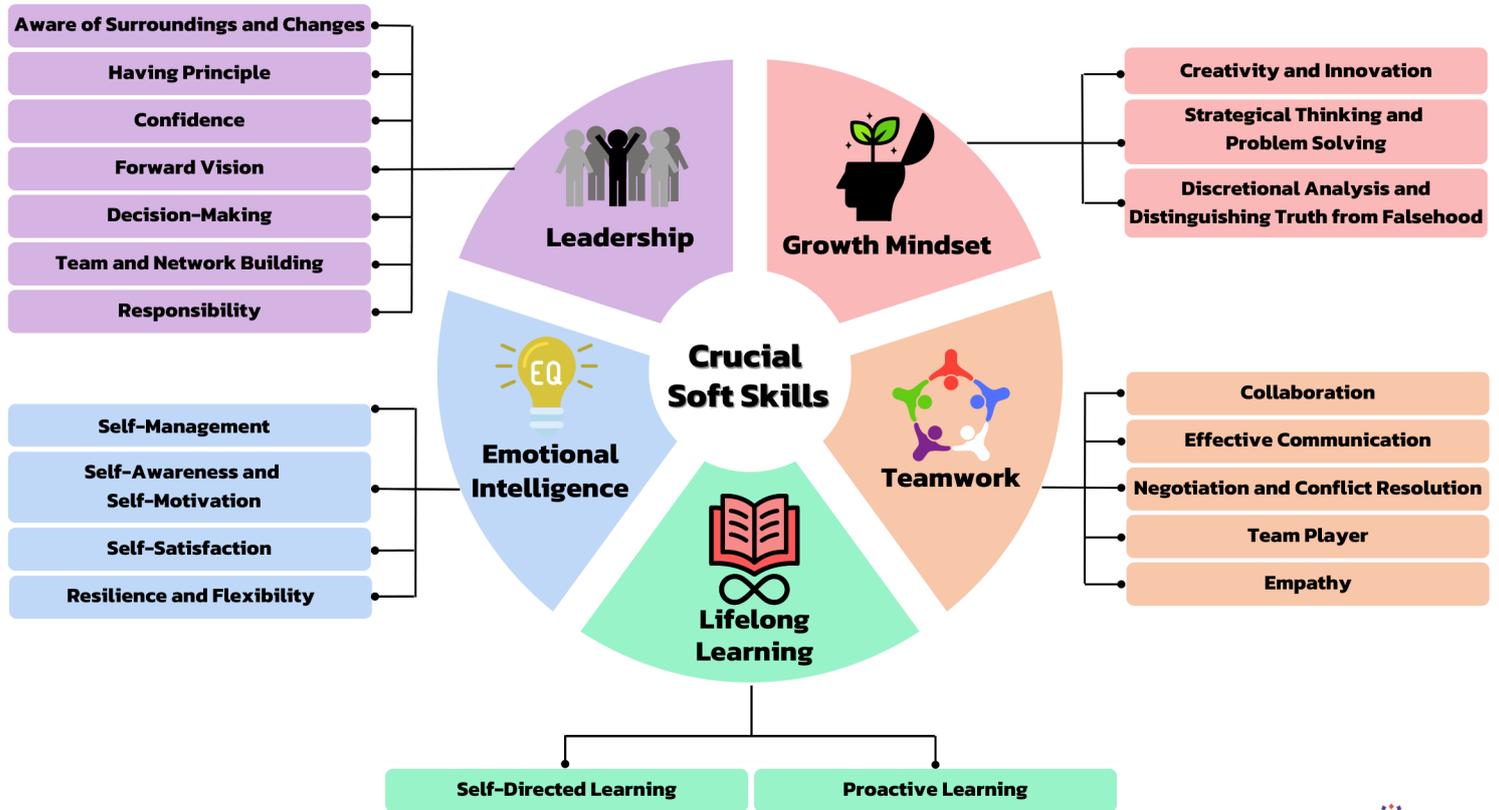
# SOFT SKILLS FOR FUTURE DEVELOPMENT

The passage discusses the global competitive landscape under the influence of changes in the economy, society, environment, and digital technology. These changes lead to a transformation in the roles and responsibilities of occupational groups that require essential skills for personal development and collaborative living in society. The importance of individuals with high skills and abilities is emphasized as a crucial factor in leading social organizations and nations toward the goals of a happy, prosperous, and innovative society.

The transition to the digital era, marked by continuous changes and developments in digital technology (Digital Transformation), has a significant impact on the labor market and necessitates adjustments in work patterns to accommodate evolving societal trends. The potential of human work in the digital age is highlighted, noting that artificial intelligence (AI) cannot replace human roles in soft skills. Soft skills, encompassing emotional intelligence, feelings, values, motivation, attitude, beliefs, ethics, and personal qualities, are identified as essential for smooth collaboration and effective communication with others.

The results of the study, from (1) researching related information to define topics through systematic literature review, such as the competitive potential of human resources, labor skills, and professional groups (Reskills and Upskills) related to social skills of global organizations like GTCI, WEF, UNESCO, etc., (2) analyzing social skills using the PEST (LE) Analysis framework for 11 professional groups, and (3) validating the study results for practical application through in-depth interviews and workshops both domestically and within the ASEAN group, reveal that the social skills necessary to support future development consist of 5 main social skills: (1) Leadership, (2) Growth mindset, (3) Emotional intelligence, (4) Lifelong learning, (5) Teamwork, and 21 sub-skills, as shown in the image on the next page.

# CRUCIAL SOFT SKILLS FOR FUTURE DEVELOPMENT



## ASEAN WORKSHOP ON SOFT SKILLS

As part of Step 3 in the Soft skills Development initiative, the Thai Ministry of Public Health hosted a practical workshop for representatives from ASEAN member countries. The purpose was to gather feedback on the results of a soft skills study aimed at informing future development strategies. The workshop occurred on June 26–27, 2023, at the Athenee Hotel in Bangkok.



The meeting had a total of 204 participants, with 16 representatives from ASEAN countries, including Myanmar, Cambodia, Indonesia, Laos, Malaysia, Myanmar, and the Philippines. There were also 39 on-site participants from Thailand and 154 online participants.

Mr. Puchong Nuttasartson, Secretary General of the National Digital Economy and Society Commission, presented an introduction to the project's background, objectives, responsibilities, and the role of the NDSEC, honoring the meeting.



The meeting was also honored by Associate Professor Wisit Wisitsoraat, Permanent Secretary of the Ministry of Digital Economy and Society, who welcomed all participants from ASEAN and various organizations in Thailand.

The project presented the study results on essential soft skills for the digital era workplace, along with the refined competency standards for all 11 ICT occupational groups discussed at the meeting



Participants from ASEAN countries and Thailand provided feedback on the definitions of soft skills, core skills, sub-skills, and levels of soft skills during the meeting.



Participants also provided feedback on the revised competency standards for all 11 ICT skills, emphasizing additional improvements to soft skills definitions.



The meeting was honored by experts from both the public and private sectors in the ICT field, as well as human resource management, who contributed their insights and feedback on the study results.



At the meeting, delegates from the 7 ASEAN countries shared insights on digital transformation trends, workforce readiness, and the adoption of ICT professional skill standards in their respective nations.



Feedback and suggestions from ASEAN representatives, Thai participants, and experts have been incorporated to improve both soft skills and ICT professional skill standards.

# DEFINITION OF SOFT SKILLS (CORE SKILLS)

## LEADERSHIP

Individuals possess qualities and skills such as intelligence, creativity, vision, situational problem-solving, open-mindedness, empathetic listening, decisiveness, team management, motivational leadership, task delegation, providing opportunities, and fairness.

## GROWTH MINDSET

People can recognize diverse thinking patterns like creativity, strategic problem-solving, analytical reasoning, and a flexible learning mindset. Embracing these patterns can drive transformative changes, cultivating a positive outlook on human potential and success, while being open to feedback and hands-on learning enhances professional expertise development.



## TEAMWORK

People can build positive relationships through effective communication, teamwork, creative problem-solving, and a commitment to equality and justice. Being responsible citizens involves actively addressing collective issues and contributing to the betterment of society, the nation, and the global community.

## EMOTIONAL INTELLIGENCE

People can manage emotions, foster self-motivation, maintain emotional stability, embrace change, adopt a positive perspective, show empathy, analyze emotions truthfully, practice resilience, handle stress, find satisfaction, and cultivate inner peace and happiness.

## LIFELONG LEARNING

People can embrace a holistic approach for personal development through proactive learning, engaging in activities like experiential learning, knowledge exchange, and lifelong, goal-oriented improvement of individual and collective abilities.

# LEADERSHIP

Leadership qualities encompass traits and skills like intelligence, creativity, vision, situational problem-solving, open-mindedness, empathetic listening, decisiveness, team management, motivational leadership, task delegation, providing opportunities, and fairness, categorized into different levels.



## Level 1: Basic Level

Exhibiting self-leadership behaviors, being aware of and understanding one's roles and responsibilities, taking responsibility for work with a strong sense of honesty and integrity, demonstrating enthusiasm to learn new things related to one's profession within the context of both national and international settings. Communicating effectively through both nonverbal and verbal means, actively listening to build positive relationships with others, identifying the future impact of changes, making risk-informed decisions, taking responsibility for one's actions, and consistently acting ethically and legally.



## Level 2: Intermediate Level

Exhibiting Level 1 skills, exploring innovative solutions, translating and analyzing predictive data and trends, utilizing information for career development, achieving success, appreciating diverse perspectives, willingly learning from others, fostering teamwork, creating motivation, task delegation, providing opportunities, and practicing fairness. Strategically planning for systematic change, problem-solving, enhancing processes/techniques, working with multidimensional data, sacrificing personal comfort for the collective benefit.



## Level 3: Advanced Level

Exhibiting Level 2 skills and applying beneficial changes to oneself and society, establishing vision, goals, and strategies to cope with ongoing changes. Providing consultation, advising others on applying information for successful career development, expressing constructive feedback or improvement suggestions when observing societal impacts. Disseminating information, knowledge-sharing, and inspiring community-beneficial initiatives. Facilitating and promoting positive relationships, addressing conflicts within roles and responsibilities towards society impartially. Encouraging others to act ethically and legally, advocating for justice and the overall benefit of the community.

# LEADERSHIP

The leadership competency includes the following sub-skills:

<b>Sub-skills</b>	<b>Definition</b>
Aware of Surroundings and changes	Individuals can stay informed about various matters to manage and adapt to situations and changes effectively for successful outcomes.
Having Principle	Individuals can uphold integrity, ethics, and honesty towards themselves and others within the framework of their nation's society and culture.
Confidence	Individuals can envision the future, plan, and execute using appropriate techniques and methods.
Decision-Making	Individuals can think quickly based on the principles of accuracy and precision.
Team and Network Building	Individuals can provide accurate information, motivate, define roles and collaborate within a network, enabling successful achievement of goals swiftly.
Responsibility	Individuals can take responsibility, forgive, and prioritize the common good.

# GROWTH MINDSET

Thinking expansively involves recognizing diverse thinking patterns—creative, innovative, strategic, and analytical—and fostering a flexible learning mindset. These patterns facilitate transformative changes, cultivating a positive outlook on human potential and success. Embracing feedback and hands-on learning enhances expertise across the following levels:



## Level 1: Basic Level

Exhibiting intellectual skills and problemsolving behavior involves posing questions or identifying issues from situations or occurrences. It includes specifying the relationship of the problem or task, identifying causes and effects, and evaluating pros and cons of various aspects. It also entails planning survey methods, conducting checks, and seeking recommendations while actively seeking opportunities for personal development through acquiring useful knowledge.



## Level 2: Intermediate Level

Exhibiting Level 1 skills involves analyzing and creatively planning solutions to complex tasks. It includes analyzing situations, identifying main and sub issues, and specifying positive and negative impacts. Planning, predicting problems, and laying out preventive measures for both short and long term are essential. Applying knowledge from prototypes or examples is utilized in planning, problem-solving, and improving work performance.



## Level 3: Advanced Level

Exhibiting Level 2 skills involves designing/developing advanced thinking, planning problem-solving strategies, assessing the importance and impacts of problems, covering all dimensions through the complex relationships of the issues. Creating mental models or innovations using novel and appropriate ideas, testing through innovative thinking or innovation before application or expansion to the target audience, and sharing/leveraging the network for beneficial learning exchange for individuals/organizations in the general community.

# GROWTH MINDSET

The skills of expansive thinking include the following sub-skills:

<b>Sub-skills</b>	<b>Definition</b>
Creativity and Innovation	Individuals can employ creative thinking processes by using imagination and expression skills to create unique and distinctive things, leading to the development of novelty or innovation.
Strategical Thinking and Problem Solving	Individuals can find optimal solutions or alternatives under various conditions by following a process that includes setting goals, analyzing and evaluating situations, identifying the best options, planning actions, implementing them, and evaluating results to achieve desired objectives.
Discretionary Analysis and Distinguishing Truth from Falsehood	Individuals can critically reason by thoroughly examining information, evidence, distinguishing between facts and opinions, verifying the accuracy and reliability of data, forming hypotheses to identify the cause of a problem, and finding solutions.

# EMOTIONAL INTELLIGENCE

Emotional intelligence involves controlling emotions, fostering self-motivation, ensuring emotional stability, adapting to change, embracing a positive outlook, displaying empathy, analyzing emotional truths, building resilience, managing stress, finding life satisfaction, and nurturing inner peace and happiness across different levels.



## Level 1: Basic Level

Exhibit behaviors of emotional control and self-confidence, regulate behaviors and expressions appropriately in all situations, restrain intense emotions by avoiding stressful situations, be aware of emotions and their pros and cons, understand problems with a positive perspective, have confidence in one's ability to manage issues, and cope with stress or emotional pressure effectively.



## Level 2: Intermediate Level

Exhibit behaviors of Level 1 skills and analyze the potential for planning and self-management. Effectively manage emotions without negatively impacting oneself, others, and society. Proactively plan and anticipate ways to handle stress and emotional pressure. Adapt to change with appropriate flexibility, maintain a positive perspective on the world, see opportunities more than threats or problems, and learn to apply situations for personal benefit. Lead oneself to overcome obstacles, endure and adapt through personal crises successfully.



## Level 3: Advanced Level

Exhibit behaviors of Level 2 skills and maintain ongoing personal development. Sustain oneself in the journey of personal development towards life success. Emotionally resilient, unwavering in the face of challenges or obstacles in work or life. Cultivate happiness and balanced satisfaction in life, serving as a model for overcoming difficulties or challenging situations.

# EMOTIONAL INTELLIGENCE

Emotional intelligence skills comprise the following sub-skills:

<b>Sub-skills</b>	<b>Definition</b>
Self-Management	Individuals can recognize and control their own emotions and needs, expressing them appropriately.
Self-Awareness and Self-Motivation	Individuals can recognize their own potential, create inspiration and motivation for themselves, and have a strong determination to achieve their goals.
Self-Satisfaction	Individuals can lead a happy life, manage their emotions and stress, take pride in themselves, find satisfaction in life, and experience inner peace and happiness.
Resilience and Flexibility	Individuals can lead themselves to overcome challenges, persevere, adapt, and successfully navigate through personal crises.

# LIFELONG LEARNING

Lifelong learning means individuals can adopt a holistic perspective covering essential needs for self-development. It involves proactive learning, seeking various activities such as experiential learning, knowledge exchange, and continuous learning in all aspects, with the goal of enhancing personal and overall knowledge and abilities throughout life, categorized into the following levels:



## Level 1: Basic Level

Showcasing a commitment to ongoing learning and adeptly organizing a personalized learning environment. Conducting research from diverse sources, identifying gaps in knowledge, and proactively developing skills in line with professional responsibilities. Analyzing required knowledge, recognizing strengths, weaknesses, and potential obstacles, while aligning with acquired skills and preferred learning methods. Making informed decisions about conducive learning environments, optimizing places and channels, and effectively managing time. Drawing inspiration from diverse media and successful individuals for continuous improvement.



## Level 2: Intermediate Level

Demonstrating skills at Level 1 and analyzing the assessment of learning progress. Analyzing and organizing content or knowledge that is beneficial for practical application. Addressing obstacles that hinder successful learning. Engaging in knowledge exchange with individuals and various channels to enhance personal knowledge. Regularly assessing one's knowledge level, skills, or progress.



## Level 3: Advanced Level

Demonstrating skills at Level 2 and developing expertise by applying acquired knowledge for personal and collective benefits. Planning, implementing, inspecting, and developing until achieving expertise in applying learned knowledge for personal and collective benefits. Expanding knowledge impact by disseminating work through various channels such as conferences, exhibitions, journals, and online media. Inspiring others through teaching, mentoring, and providing guidance to apply knowledge for professional development, leading to success. Serving as a lifelong learning example in self-development.

# LIFELONG LEARNING

Lifelong learning skills consist of the following sub-skills:

<b>Sub-skills</b>	<b>Definition</b>
Self-directed learning	Individuals can set learning goals, explore knowledge from various sources on their own, apply the acquired knowledge through experimentation, practice, assess, refine, and develop until expertise is achieved. They can then utilize the gained knowledge for personal and collective benefits.
Proactive Learning	Individuals can learn from real-world practice, build knowledge through advanced cognitive processes such as analysis, synthesis, and evaluation, and produce creative work. They can exchange knowledge by disseminating their work through various channels such as meetings, stages, seminars, journals, online media, and more.

# TEAMWORK

Teamwork and collaboration skills encompass an individual's capacity to nurture positive relationships, communicate adeptly through verbal and non-verbal means, allocate tasks within a team, share ideas, collaborate, and innovatively solve problems. These skills extend to promoting opportunities, equality, and fairness in society, embodying good citizenship, actively addressing communal challenges, and embracing responsibility as a citizen at local, national, and global levels. The categorization is based on different proficiency levels.



## Level 1: Basic Level

Demonstrating skills in building relationships, effective communication, participation, and fulfilling responsibilities. Establishing and collaborating well with others in the workplace. Using appropriate body language and speech, adapting to individuals needing communication or coordination. Understanding the emotions, feelings, and behaviors of others for mutual benefit in building partnerships, networking, or coordinating work. Valuing one's wisdom, culture, and respecting the cultural diversity to work together. Recognizing and protecting one's freedom and rights, respecting the laws and freedoms of others. Being attentive and aware of environmental issues and their impact on the quality of life.



## Level 2: Intermediate Level

Demonstrating Level 1 skills and understanding others, collaboratively solving problems through effective communication while prioritizing responsibility towards society and the environment. Analyzing conflicts, communicating information sincerely and directly, presenting data and opinions based on facts to foster understanding and support. Engaging with stakeholders in rational problem-solving and conflict resolution. Volunteering for public service activities, adjusting lifestyles to support environmental conservation. Upholding principles of freedom and equality, refraining from physical, verbal, and social harassment.



## Level 3: Advanced Level

Demonstrating Level 2 skills involves encouraging, supporting, initiating, and networking to create awareness of necessary developments. This includes taking responsibility and acting appropriately in civic roles, smoothly controlling negotiations from start to finish, and finding mutually beneficial solutions. Establishing communication networks to support successful work practices, influencing others through diverse methods, inspiring and guiding them to change attitudes, perspectives, ideas, and positions to solve personal and collective problems. Initiating activities to sustain overall benefits at the community, social, and international levels, while also assisting and sharing with others and taking responsibility in civic roles within the community and global society.

# TEAMWORK

Teamwork and collaboration skills comprise the following sub-skills:

Sub-skills	Definition
Collaboration	Individuals can know, understand, and accept the differences of others. They can be empathetic, considerate, and express themselves appropriately.
Effective communication	Individuals can communicate both verbally and in writing to provide accurate information in line with the purpose of communication, as well as collaborate successfully with others.
Negotiation and Conflict Resolution	Individuals can make decisions and resolve problems peacefully to achieve compromise and find solutions together.
Team Player	Individuals can listen to feedback, engage with diverse cultures, be aware and participate in addressing collective issues, including those related to society and the environment. They take responsibility for their roles as citizens in society, the country, and the global community.
Empathy	Individuals can understand the thoughts, feelings, and behaviors of others, show empathy, forgive, avoid prejudice, and assist as members of society.



# **Artificial Intelligence Roadmap**

**(Version 1)**

# GLOBAL POLICIES AND GUIDELINES FOR DRIVING AI TECHNOLOGY

The rise of artificial intelligence has prompted global organizations and governments to develop strategies, policies, and guidelines for its widespread adoption. Canada, China, and Finland initiated official policies in 2017, and Italy and Thailand followed suit in 2022.

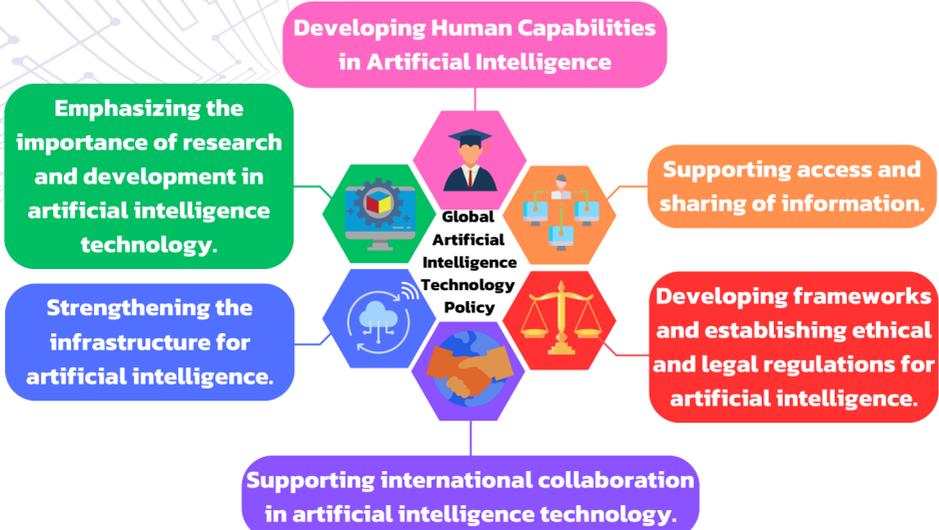
Year	Country
2017	Canada, China, Finland
2018	Australia, France, Germany, India, Mauritius, Mexico, Sweden
2019	Argentina, Austria, Bangladesh, Botswana, Chile, Colombia, Cyprus, Czech Republic, Denmark, Egypt, Estonia, Finland, Japan, Kenya, Lithuania, Luxembourg, Malta, Netherlands, Portugal, Qatar, Romania, Russia, Sierra Leone, Singapore, United Arab Emirates, United States of America, Uruguay
2020	Algeria, Bulgaria, Croatia, Greece, Hungary, Indonesia, Latvia, Norway, Poland, Saudi Arabia, Serbia, South Korea, Spain, Switzerland
2021	Brazil, Ireland, Peru, Philippines, Slovenia, Tunisia, Turkey, Ukraine, United Kingdom, Vietnam
2022	Italy, Thailand

Several countries have initiated studies on the viability of AI policies.

Year	Country
2021	Armenia, Bosnia, Cuba, Iceland, Monaco, New Zealand, Oman
2022	Azerbaijan, Belgium, Benin, Israel, Jordan, Nigeria, Uzbekistan

## GLOBAL AI POLICIES

Although each country is at a different level of development in artificial intelligence technology, overall, the policies driving AI technology in each country share many similarities.



### Developing Human Capabilities in Artificial Intelligence

The rise of artificial intelligence (AI) in shaping the economy has prompted governments and organizations worldwide to enact policies aimed at strengthening the workforce's expertise in AI. This involves creating tailored curricula from K-12 to higher education levels, as demonstrated in countries such as China and Portugal. Additionally, nations are implementing strategies to refine existing skills and introduce new ones, aligning them with specific professions through diverse education and training initiatives overseen by relevant authorities.

### Emphasizing the importance of research and development in artificial intelligence technology.

Policies encouraging research and development in artificial intelligence are pivotal in various countries, including the United States, China, and the European Union. Substantial budgets are earmarked to support AI-related research projects across the education sector, government, and pertinent private entities.

### **Strengthening the infrastructure for artificial intelligence.**

The development and use of artificial intelligence technology require essential infrastructure, including high-speed internet, high-capacity computing devices, and cost-effective data storage space. Many countries recognize this necessity and have policies to enhance these foundational structures, such as investing in the widespread implementation of 5G internet networks and establishing affordable computing and data storage centers specifically for research and development in artificial intelligence technology.

### **Supporting international collaboration in artificial intelligence technology.**

Policies promoting global cooperation in AI research, like the U.S. IRCAI program, involve nations contributing to global AI standards. Many countries actively participate in shaping international guidelines for artificial intelligence technology. Singapore collaborates with organizations like the International Electrotechnical Commission (IEC) to formulate policies for AI technology.

### **Developing frameworks and establishing ethical and legal regulations for artificial intelligence.**

The majority of policies focus on improving governance measures and technical standards for AI technologies to prevent violations of privacy, citizen rights, freedom of expression, and enact relevant laws pertaining to artificial intelligence, both directly and indirectly. Examples include the United States and the European Union.

### **Supporting access and sharing of information.**

Access to data is another crucial factor influencing the development of artificial intelligence technology. Many countries prioritize access to and sharing of this data, with policies establishing centralized data hubs open to the public. For example, the United Kingdom has established a data hub in a format suitable for direct use by machine learning. Denmark has plans to disclose weather, climate, and sea condition data to the public.

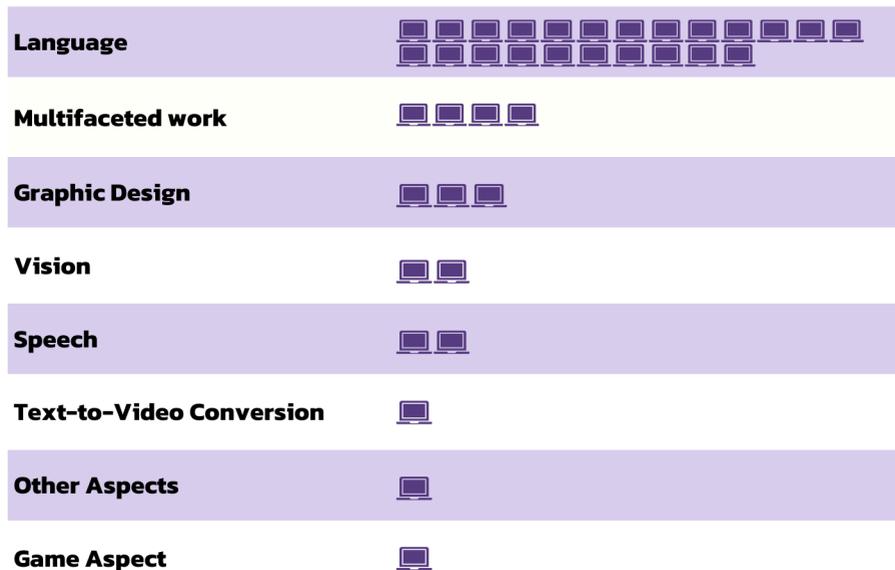
# GLOBAL TRENDS IN THE USE OF ARTIFICIAL INTELLIGENCE TECHNOLOGY

## Trends in Research

The AI research landscape is expanding, as indicated in the AI Index Report 2023 from Stanford University (Stanford HAI, 2023). Examining global AI research publications from 2010 to 2021, the report demonstrates a significant growth, with the total number of published AI research papers more than doubling from around 200,000 in 2010 to approximately 500,000 in 2021. Notably, Pattern Recognition, Machine Learning, and Computer Vision emerge as the most prolific subfields within AI research

## Key Machine Learning Systems

In 2022, there were 32 key machine learning systems from the industry, while the academic sector contributed only 3 systems. These systems were categorized based on the content scope of the key machine learning systems as follows:



 The most important machine learning system | system

Source Stanford HAI, 2023

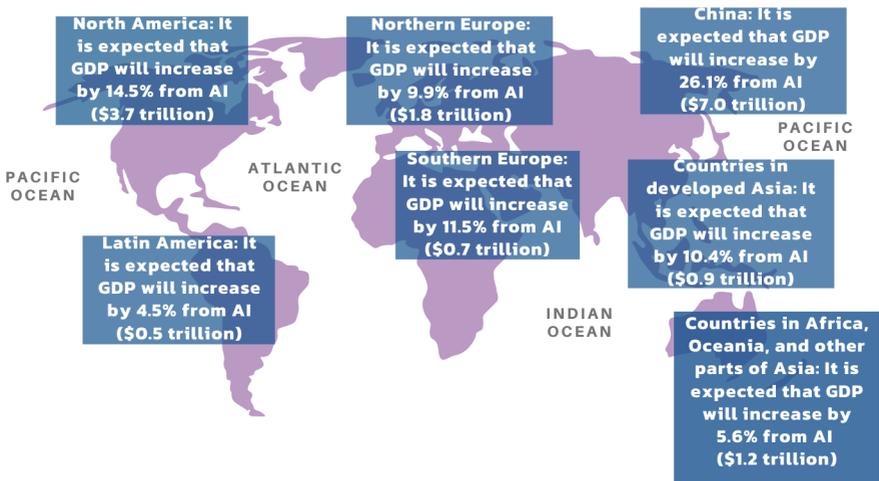
## Business Trends

According to the Global Artificial Intelligence Study by PwC (PwC analysis, 2017), the development of faster computers and the widespread application of AI are expected to contribute to a global GDP increase of approximately 14% by 2030, with an additional value of around USD 15.7 trillion for the United States.

The economic impact of AI will manifest through increased efficiency in businesses employing automated processes (including the use of robotics and autonomous vehicles), improved business workforce productivity through AI technology, and increased consumer demand for AI-enhanced or personalized high-quality products and services.

The impact on GDP from the creation of new AI-driven products or services and changes in consumer behavior resulting from the use of AI may contribute significantly to GDP growth in 2030, categorized by economic sectors.

### The Impact of Artificial Intelligence on GDP in 2030 Categorized by Economic Sectors



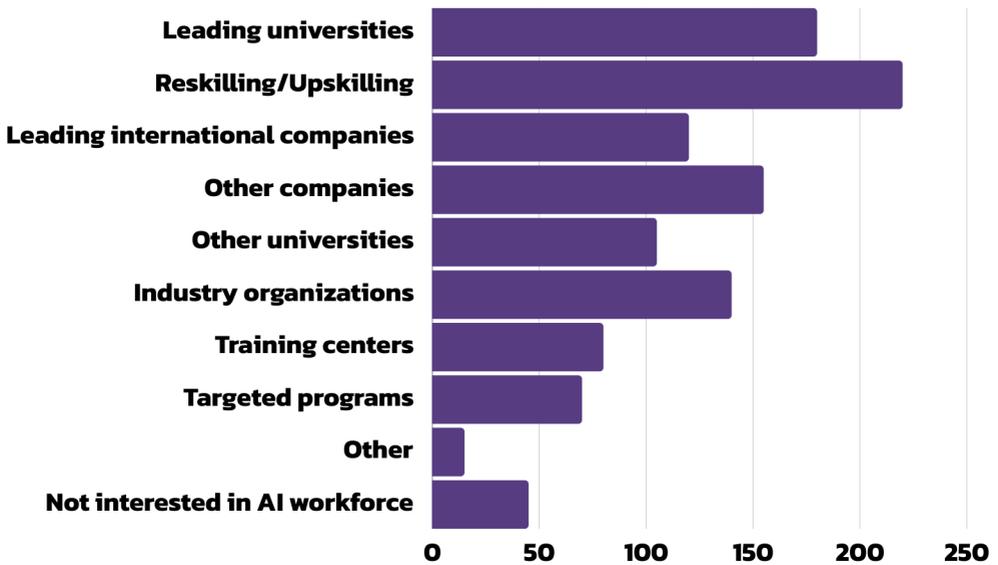
Source PwC analysis, 2017

## Trends in Workforce

The Future of Jobs report by the World Economic Forum for the years 2023–2030 suggests that positions in artificial intelligence and machine learning will be the most job-intensive. Among the top 10 positions expected to generate the most jobs, six are related to artificial intelligence: (1) AI and machine learning specialists, (2) business intelligence analysts, (3) data security analysts, (4) fintech engineers, (5) data and analytics scientists, and (6) big data specialists.

According to a 2022 survey by McKinsey & Company, the current AI workforce is predominantly shaped by skill development, both in traditional and emerging areas. As follows:

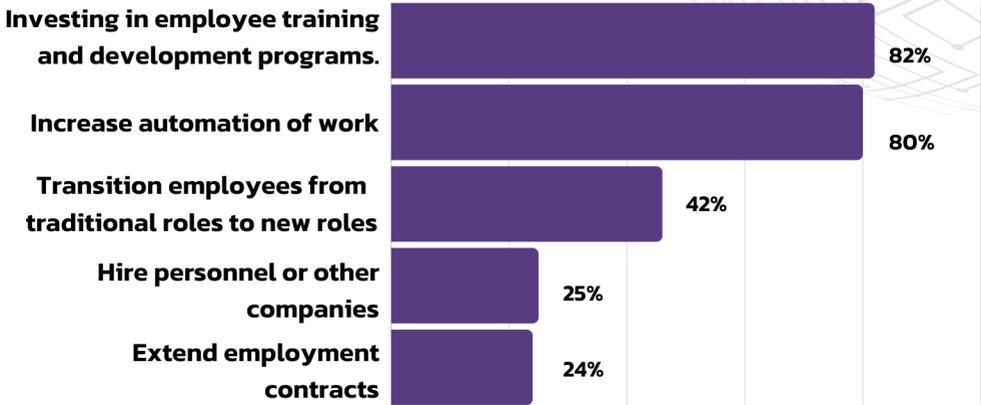
### The origin of the workforce in artificial intelligence at present.



Source McKinsey & Company, 2022

The survey results from McKinsey & Company align with the organizational workforce planning strategy report from the World Economic Forum. The organization prioritizes investment in training and development programs for employees. Details are as shown in the image.

### Organizational workforce planning strategy for the future



Source WEF, 2023

# ASEAN ICT SKILL STANDARDS FOR AI

The ASEAN acknowledged the Professional ICT Competency Standards for AI from ONDE, embracing nine sub-skills.

## FOUNDATIONS OF ARTIFICIAL INTELLIGENCE

### Mathematics and Statistics

Has a grasp of mathematical knowledge, concepts, and theories, applying mathematics to support analysis and development.



## STEPS IN DEVELOPING ARTIFICIAL INTELLIGENCE



### Business Intelligence

Specify clear goals or objectives, addressing both business-related and general issues.



### Data Analysis

Capable of analyzing and presenting organized data in various forms, including basic, diagnostic, predictive, and prescriptive approaches.



### Data Engineering

Can design, develop, test, and maintain data pipelines, specify algorithms used, and is capable of training models.



### Machine Learning

Can analyze and design data visualization, research, analyze, and apply state-of-the-art models, understands and selects appropriate machine learning algorithms.



### Software Product Engineering in AI

Can design, develop, test, and maintain components of AI software products.



### Technical Expertise

Can experimentally apply the developed AI knowledge in environments closely resembling real-world usage for performance testing.



## SUPPORTING THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE.



### Research in Artificial Intelligence

Exploring new approaches in developing machine learning models and artificial intelligence.



### AI GOVERNANCE

Understanding the rules, regulations, and ethical considerations related to artificial intelligence, and supporting other departments in AI development.

## APEC SYMPOSIUM

ONDE hosted a conference on APEC Professional Skills Standards for Artificial Intelligence at the Centara Grand at Central Plaza Ladprao on May 2, 2566. The event aimed to share SOC's study results on APEC Professional Skills Standards for AI with member economies.



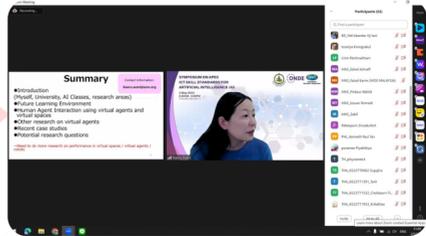
In this conference, there were a total of 237 participants, including 21 attendees from APEC economies. The representatives came from Australia, Brunei, Canada, Cambodia, Indonesia, Japan, Malaysia, Myanmar, South Korea, the United States, and Vietnam. Additionally, there were 53 participants from Thailand attending the online meeting, and a total of 164 participants joined the conference virtually.

Mr. Puchong Thitnatsong, Secretary-General of the National Digital Economy and Society Commission, graced the meeting, offering insights into the project's background, objectives, and SOPA responsibilities.



The meeting also received the honor of Professor Wisit Srisawasdi, Permanent Secretary of the Ministry of Digital Economy and Society, who welcomed participants from APEC member economies and various organizations in Thailand.

Experts in artificial intelligence from Japan and the United States delivered lectures on the current applications of AI in various fields, including healthcare, business, and even emotion recognition.



AI experts from Thailand lectured on crucial artificial intelligence skills for startup companies.

The project presented the study results on professional standard skills in artificial intelligence for conference participants.



Participants from APEC member economies and Thailand exchanged ideas on the professional skills standards for artificial intelligence during the conference.



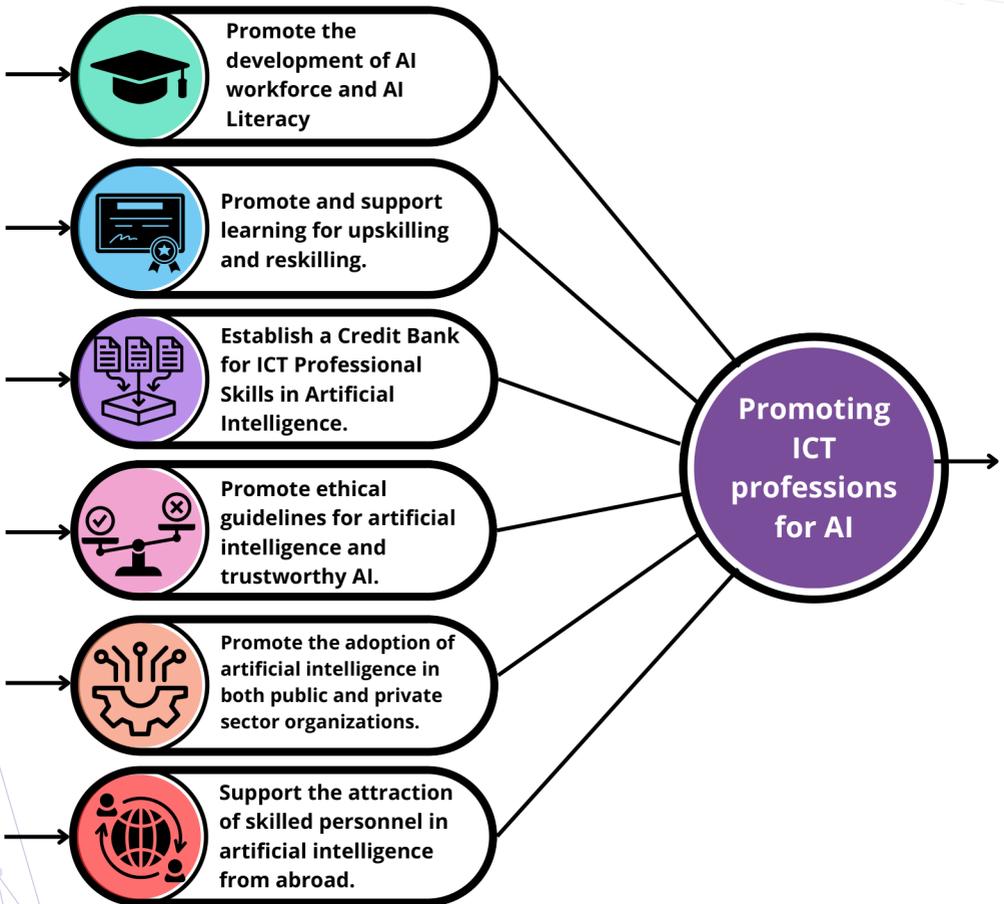
Attendees shared perspectives on the current AI landscape. The private sector participants expressed keen interest in leveraging AI and sought government support to facilitate this transformation.



Most of the meeting participants expressed the opinion that the skills are comprehensive and suitable.

# AI PROFESSIONAL PROMOTION GUIDELINES

The roadmap is created after examining the global and Thai AI workforce, national digital development policies, the National AI Development Plan, ICT professional skill standards, ethical guidelines by Software Park Thailand (SOPA), ongoing soft skill standards development for ICT professions by SOPA, and recent AI advancements over the last two to three years. The objectives are:



## **The development of artificial intelligence workforce**

The development of artificial intelligence workforce is divided into two main directions:

### **Developing the AI Developer Workforce**

The National AI Development Plan (NAIS) sets a target of developing an AI workforce of 30,000 people by the year 2027. This workforce is categorized into three levels:

1. **Advanced Skills (AI Profession):** Developers specializing in new AI knowledge, deep learning technology, AI algorithms, or software systems for AI development.
2. **Intermediate Skills (AI Engineer):** Developers creating tools, applications, or integrating software systems for AI applications.
3. **Basic Skills (AI Beginner):** Users utilizing tools or platforms for AI development in creating products, services, or applications.

### **Developing AI Literacy Skills**

In addition to the direct AI development workforce, promoting and supporting individuals who are not directly involved in AI development, as well as the general public, to have AI literacy skills is equally crucial. This will enable them to understand and use AI effectively, leading to broader and more widespread applications of AI technology for personal and organizational benefits. Developing skills in this group will further enhance the extensive adoption of artificial intelligence.

## Promotional Activities

1. **Development of Model Curriculum in AI:** Creation of a model curriculum in artificial intelligence (AI) aligned with ICT professional skills standards to support degree programs.
2. **Development of Model Curriculum for Short-term Training:** Formulation of a model curriculum for short-term certificate-based training as a guide for AI professional skills training in non-degree programs.
3. **AI Literacy Skills Standardization:** Establishment of AI literacy skills standards as a guideline for developing understanding and using AI, targeting individuals not directly involved in AI development.
4. **Certification of Short-term AI Training Programs:** Recognition of short-term AI training programs developed by private organizations. To further promote the development of AI skills crucial for organizational personnel, guidelines should be established to support private sector training initiatives. This may include tax incentives for organizations promoting workforce development through training or providing financial support to private sector organizations that develop standardized courses and conduct training.
5. **Certification of Relevance:** Issuance of certificates verifying the alignment of related courses with the university's AI curriculum and ICT professional standards for AI. This aims to encourage the alignment of university course development with ICT professional standards for AI.
6. **AI Skill Checklist:** Development of an AI Skill Checklist in the form of a table, outlining AI skills with detailed definitions. This allows interested individuals to self-assess their skill levels and provides guidance on further skill development. The checklist can be based on ICT professional standards for AI.
7. **Soft skills Development Curriculum:** Creation of a curriculum to develop essential soft skills, building upon the importance mentioned earlier of problem-solving skills. Fostering appropriate soft skills in individuals enables effective collaboration and problem-solving within an organization, ensuring smooth and efficient operations.

## The development of Learning for Upskilling and Reskilling.

The development of existing skills and the acquisition of new skills by the workforce within an organization are crucial. This allows organizations to adapt and enhance their competitiveness, supporting changing customer needs. Moreover, the development of personnel to acquire new skills becomes increasingly important when educational institutions cannot produce individuals with skills aligned with the timely needs of organizations. This is evident in the field of artificial intelligence (AI) skills, as indicated by workforce surveys, with many employees acquiring AI skills through internal skill development and learning new skills within their organizations.

### Promotional Activities

1. Development of Model Courses for Short-term Certificate Training: Creating model courses for short-term certificate training to support the development of new talents and enhance the skills and learning of new skills for experienced personnel.
2. Development of Course Content According to the Model Curriculum: Developing course content based on the model curriculum and then proceeding with training. This training can be conducted in various formats, such as intensive on-site training, online training, or in-house training within the company or organization. Additionally, it is possible to gather content from existing online learning systems that align with the course content and integrate it into the training program. This short-term course development can also reinforce necessary soft skills within the content, allowing participants to develop soft skills such as problem-solving and creative thinking alongside technical skills.
3. Creating a Skills Taxonomy is vital for successful skill acquisition, focusing on understanding competencies—skills individuals possess within and outside the organization. Objectives represent essential skills for competition (Tamayo et al., 2023). Assessing competencies can be achieved through a Skills Taxonomy, categorizing and subcategorizing skills. The Global Skills Taxonomy by the World Economic Forum offers a global perspective but lacks sub-skills related to artificial intelligence. Developing an AI-specific taxonomy will enhance organizational workforce development.

## **Establish a Credit Bank for ICT Professional Skills in Artificial Intelligence.**

Credit Bank serves as a tool to broaden skill development beyond educational institutions, offering certified long and short-term courses. Individuals completing these courses can combine their training outcomes with skills acquired from other organizations. The creation of a Credit Bank for the ICT professional skills standard in AI will record and certify education and training aligning with the ICT professional skills standard for AI. This encourages smooth development of AI skills, allowing individuals to choose diverse training from various organizations and formats, with certifications contributing to a recognized professional skill level.

### **Promotional Activities**

1. Develop a centralized system supporting Credit Bank.
2. Collaborate with relevant organizations nationally and within ASEAN to integrate Credit Bank data.
3. Provide Credit Bank services and certifications.

## **Promote ethical guidelines for artificial intelligence and trustworthy AI.**

Ethics in artificial intelligence (AI) has gained significant attention and scrutiny in recent years due to the rapid advancements in AI technologies. The substantial progress in AI has raised concerns about the ethical implications of AI, particularly in the application of AI technologies in inappropriate ways. Trustworthy AI has emerged as a framework for developing AI systems that consider the role, context, and capabilities of the system. Various international organizations and governments have established frameworks for trustworthy AI, such as the OECD's Risk Management Framework for Trustworthy AI and the European Commission's Framework for Trustworthy AI. Therefore, promoting AI ethics and developing AI in line with trustworthy AI concepts is crucial for appropriate AI development in Thailand and global recognition.

### **Promotional Activities**

- 1.The development of guidelines for implementing AI ethics into practice and real-world applications, along with promoting the development of trustworthy AI processes, is currently underway. The National Health Security Office (NHSO) has established guidelines and measures to raise awareness among the general public and organizations regarding AI ethics. The next step is to cultivate a culture of genuine adherence to AI ethics, ensuring sustainable, transparent, lawful development aligned with international standards for the confidence, security, and trustworthiness of AI systems in Thailand. This development should consider regulatory frameworks and the establishment of overseeing bodies responsible for AI ethics and the development of trustworthy AI.
- 2.Development of strategies to mitigate risks from the application of artificial intelligence involves studying and summarizing potential impacts at the personal, organizational, and societal levels. Additionally, disseminating study results in the form of case studies to allow organizations and interested parties to understand risk reduction approaches in the use of artificial intelligence.

## **Promote the adoption of artificial intelligence in organizations.**

The results of a survey on the adoption of artificial intelligence in various organizations conducted by the Electronic Transactions Development Agency (ETDA) and the National Science and Technology Development Agency (NSTDA) show that 28.2% of surveyed organizations in Thailand believe there is currently no necessity to use artificial intelligence. They are either in the process of gathering information about artificial intelligence or lack readiness and require additional support to implement artificial intelligence in their organizations. Therefore, there is a need to develop strategies to promote awareness and provide measures and support for organizations that are not yet ready, enabling them to appropriately integrate artificial intelligence to enhance competitiveness on a global scale.

### **Promotional Activities**

1. Development of strategies to promote the effective adoption of artificial intelligence (AI) technology in both public and private sector organizations, along with the establishment of an AI Transformation Clinic as a consulting unit to facilitate the implementation of AI in organizations. Additionally, recommendations for organizations that can contribute to the development of AI capabilities.
2. Development of guidelines to enhance the skills and understanding of government officials and employees in government agencies to effectively utilize AI, aiming to improve the efficiency of public services in alignment with the transition to a digital government.
3. Create databases for organizations offering AI development services, establishing assessment criteria, and categorizing organizational capabilities. This facilitates individuals looking to incorporate AI into their organizations by allowing them to search the database and kickstart successful AI development projects.
4. The study involves creating guidelines to assess organizations' readiness for AI adoption, considering factors like budget, data, infrastructure, and personnel. Following the assessment, tailored recommendations for effective AI application will be offered, enabling organizations to select suitable implementation strategies.

## **Attraction of Skilled Personnel in Artificial Intelligence from Abroad.**

The development of in-country talent in AI to meet the workforce demands takes time. In the short term, the local AI workforce may not be sufficient to attract highly skilled professionals from abroad. Therefore, one approach is to promote the short-term development of the country's AI capabilities.

### **Promotional Activities**

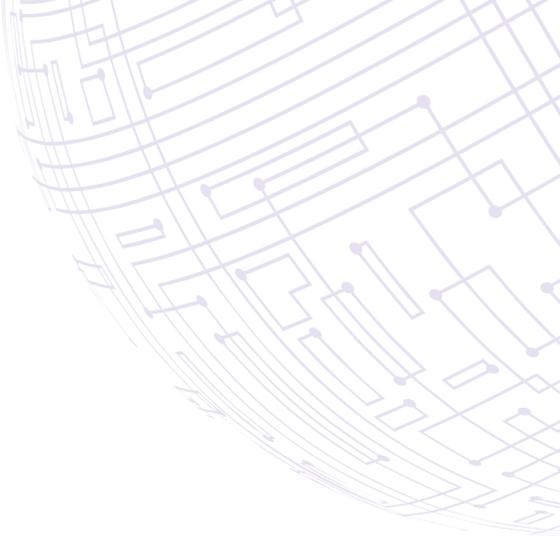
1. Development of methods for assessing professional skills according to the ICT Professional Skills Standards for AI, enabling the evaluation of skills for individuals developed abroad and setting appropriate skill levels for foreign professionals. This instills confidence in organizations hiring, facilitating quicker decision-making.
2. Development of guidelines, policy establishment, and regulatory improvements to facilitate the entry of highly skilled AI professionals into Thailand. Includes (1) assessment guidelines aligned with ICT Professional Skills Standards, (2) benefits for AI professionals and hiring organizations to encourage more workforce entry into Thailand, and (3) streamlined work permit processes for workforce migration.

## AI ROADMAP TIMELINE PROGRESS – GANTT CHART

YEAR 1				YEAR 2				YEAR 3				RESPONSIBLE ORGANIZATIONS	
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
Develop university - level model curricular			Certify university-level curricular that conform with ASEAN ICT Skills Standard								Revise university-level model curricular	MHESI Educational institutions	
Develop vocational education model curricular			Certify vocational education curricular that conform with ASEAN ICT Skills Standard								Revise vocational education model curricular	VEC Educational institutions	
Develop non-degree model curricular			Certify non-degree curricular and course that conform with ASEAN ICT Skills Standard								Revise non-degree model curricular	TPQI Educational institutions ONDE	
Develop AI Skill checklist												Revise AI checklist	ONDE
Develop ASEAN ICT skill stands for AI Literacy												Revise ICT skill standard for AI Literacy	ONDE
Promote ASEAN crucial soft skills for future developments										Revise crucial soft skills	ONDE		
		Develop non-degree courses that conform with model curricular										Revise non-degree courses	TPQI Educational institutions ONDE
Develop AI Skills taxonomy												Revise AI Skills Taxonomy	ONDE

## AI ROADMAP TIMELINE PROGRESS – GANTT CHART

YEAR 1				YEAR 2				YEAR 3				RESPONSIBLE ORGANIZATIONS
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Develop credit bank system		Collaborate with related organization to centralize credit bank system		Provide credit bank service through the credit bank system				Revise credit bank system		ONDE		
Develop practical guidelines for AI ethics and trustworthy AI										Revise practical guildlines		ONDE
				Develop practical guidelines to prevent risks from AI						Revise practical guildlines		ONDE
Develop AI transformation clinic			Develop guidelines to promote AI usage in government sectors		Provide service through AI transformation clinic			Revise AI transformation clinic		ONDE, NSTDA, DGA		
Develop centralized database for AI			Provide service for centralized database for AI						Revise centralized AI databas		ONDE, ETDA	
				Develop assessment guidelines for AI readiness						Revise assessment guidelines for AI readiness		ONDE
Develop ASEAN ICT skill standard assessment tools			Develop rule and regulation for attracting talents from outside the country							Revise ICT Skill Standards assessment tool		ONDE, OAG, MOL, Educational institutions



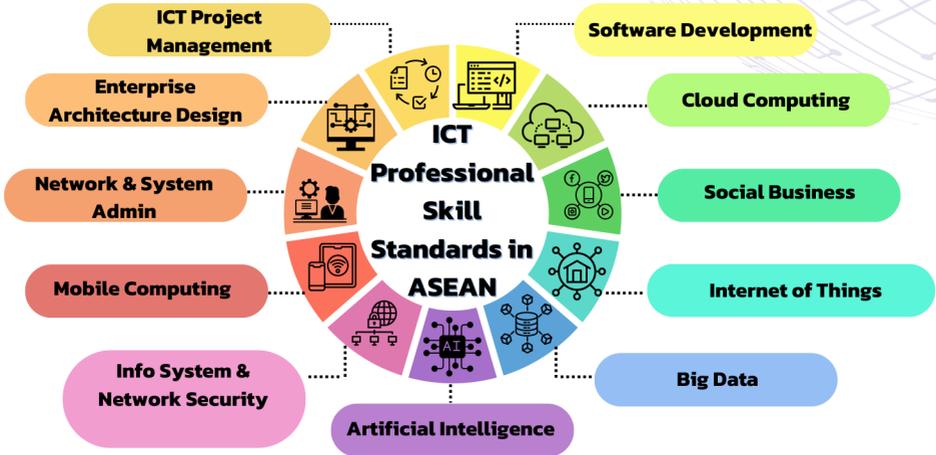


# **Revision of ASEAN ICT Skill Standards**

# ASEAN ICT SKILL STANDARDS

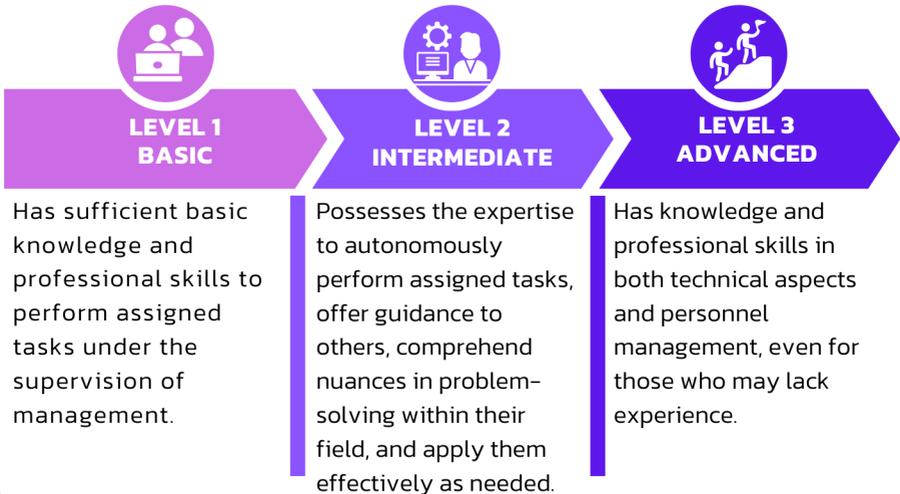
## ICT Professional Skill Standards

The ICT Skill Standards have been developed by ONDE since 2012 to support the private sector job market and international job markets. These standards have been recognized in the ASEAN member countries, totaling 11 groups.

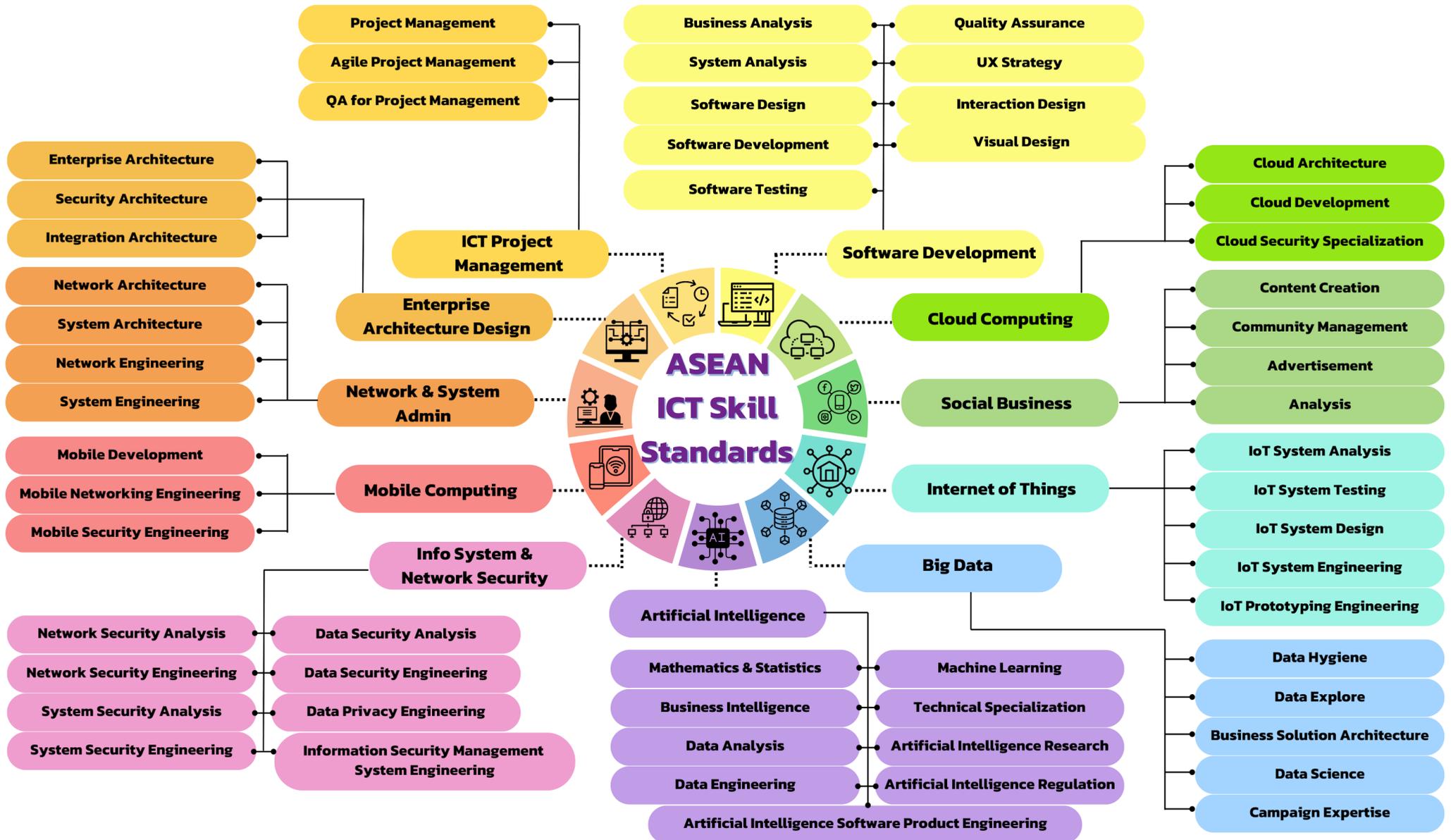


## Levels of ICT Skill Standards

Levels of ICT Skill Standards are categorized into three levels as follows:



# ASEAN ICT SKILL STANDARDS



# REVISION OF ASEAN ICT SKILL STANDARDS

## Revision of ICT Professional Skill Standards

When comparing the ICT Professional Skill Standards of all 11 groups with international standards from leading global organizations such as SFIA version 8 developed by the SFIA Council and The SFIA Foundation of the United Kingdom, the e-Competence Framework by the European Committee for Standardization (CEN), and ITSS: Skill Standards for IT Professionals from Japan, it is found that the technical standards of all 11 groups align well with these standards.

The study reveals that the defined proficiency levels of the skills mentioned above encompass soft skills that ICT professionals should possess. Therefore, the review and improvement of ICT Professional Skill Standards in this round involve integrating the essential soft skills with the existing 5 professional skills. In summary:

- Every profession should have emotional intelligence and teamwork skills for effective collaboration within a team or organization and for thriving in society.
- Professionals in analysis, design, and architecture should have advanced lifelong learning skills to continuously acquire knowledge and effectively apply new knowledge or technologies to enhance their work.
- Engineering professionals should possess advanced critical thinking skills for systematic problem-solving, leading to systemic problem-solving and improved performance.
- Professionals at levels 2 and 3 mostly oversee and manage teams, requiring leadership skills to ensure effective team performance.

# ICT SKILL STANDARD AND SOFT SKILLS MAPPINGS



## Software Development

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Business Analysis	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
System Analysis	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Software Design	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Software Development	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆

**Example:** Individuals with the ability to develop software at Level 2 should have Leadership Skills at Level 2, Growth Mindset at Level 1, Emotional Intelligence at Level 2, Lifelong Learning at Level 2, and Teamwork and Collaboration at Level 2.



## Software Development

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
UX Strategy	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Interaction Design	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Visual Design	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Software Testing	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Quality Assurance	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆

## ICT Project Management



Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Project Management	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Agile Project Management	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
QA for Project Management	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆



## Enterprise Architecture Design

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Enterprise Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Security Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Integration Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆

## Network and System Administration



Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Network Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Network Engineering	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
System Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Systems Engineering	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆



## Information and Network System Security

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Network Security Analysis	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
Network Security Engineering	3	☆☆☆	★★★	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★★★	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
System Security Analysis	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
System Security Engineering	3	☆☆☆	★★★	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★★★	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆



## Information and Network System Security

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Data Security Analysis	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Data Security Engineering	3	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Information Security Management System Engineering	3	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Data Privacy Engineering	3	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆



## Cloud Computing

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Cloud Architecture	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Cloud System Development	3	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Cloud Security Expertise	3	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆

## Mobile Computing



Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Mobile Development	3	★★★★	★★★★	★★★★	★★★★	★★★★
	2	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
	1	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Mobile Networking Engineering	3	★★★★	★★★★	★★★★	★★★☆☆	★★★★
	2	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
	1	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
Mobile Security Engineering	3	★★★★	★★★★	★★★★	★★★☆☆	★★★★
	2	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆
	1	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆	★★★☆☆



## Social Media Business

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Content Creating	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Community Management	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Advertising	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
Analysis	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆



## Big Data

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Data Hygiene	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
Data Explore	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
Business Solution Architecture	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
Data Science	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
Campaign Expertise	3	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	★☆☆	☆☆☆	☆☆☆	☆☆☆



## Internet of Things: IoT

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
IoT System Analysis	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
IoT System Design	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
IoT Prototyping Engineering	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
IoT System Testing	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
IoT System Engineering	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆



## Artificial Intelligence

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Mathematics & Statistics	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Business Intelligence	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Data Analysis	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Data Engineer	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Machine Learning	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
AI Software Product Engineering	3	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	2	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
	1	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆



## Artificial Intelligence

Sub-Skills	Skill Level	Leadership	Growth Mindset	Emotional Intelligence	Lifelong Learning	Teamwork
Technical Specialization	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
AI Research	3	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★★★	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
AI Regulation	3	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	2	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆
	1	☆☆☆	★☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆



# **Crucial Soft Skills for the Digital Era Online Training**

# SOFT SKILLS DEVELOPMENT COURSES

From the study and development of soft skills to support future development, the Office of the National Science and Technology Development Agency (ONDE) has compiled a course on essential soft skills in the digital age for dissemination, promotion, and enhancement of soft skills for workers in 11 occupational groups and the general public on the Thai MOOC platform. The course details are as follows:

## Course Descriptions

Soft skills consist of five main topics: (1) Leadership qualities and skills, including intelligence, insight, vision, decision-making, team building, and ethical work practices. (2) Growth mindset, demonstrating various thinking patterns such as creative and innovative thinking, strategic thinking, problem-solving, analytical thinking, and critical thinking. (3) Emotional intelligence, including emotional and needs control, self-motivation, stable mindset, stress and emotion management, life satisfaction, and emotional well-being. (4) Lifelong learning, with a comprehensive view covering self-development needs, seeking learning activities in all areas, and continuous improvement of personal and collective knowledge and abilities. (5) Teamwork and collaboration, fostering good relationships, effective communication, decision-making, creative problem-solving, being a good citizen, and taking responsibility for oneself in society, the country, and the global community.

## Target Audience

General interest individuals in various occupational groups, including IT professionals, farmers, wholesale and retail trade, manufacturing, hotel and accommodation services, construction, government administration, transportation, education, and other service groups, as well as the health group.

## Purpose of Behavioral Learning Objectives

1. To equip trainees with knowledge of essential soft skills in the digital age.
2. To enable trainees to acquire the necessary soft skills in the digital era.
3. To empower trainees to apply acquired soft skills for personal development in the digital age.

## Expected Training Outcomes

1. Participants will understand essential soft skills in the digital age.
2. Participants will be able to develop their own essential soft skills in the digital era.
3. Participants will be able to apply essential soft skills in their daily lives and future endeavors.

## Outcome Assessment

A comprehensive post-training test with a total of 100 questions.

## Passing Criteria for Evaluation

### Thai MOOC

A passing score of 75% on the post-training test is required to receive a certificate upon completion of all topics in this course.

### Assessment of Soft Skills Levels

Assessment of soft skills using criteria adapted from Bloom's cognitive taxonomy, including (1) Cognitive Domain, (2) Psychomotor Domain, and (3) Affective Domain. The synthesized results for assessing soft skills, core skills, and sub-skills include (1) Leadership Qualities, (2) Growth Mindset, (3) Emotional Intelligence, (4) Lifelong Learning, and (5) Teamwork and Collaboration. Each level is categorized as Level 1: Basic, Level 2: Intermediate, and Level 3: Advanced, based on the Rubrics Score criteria (Mertle, 2001):

- Below 50% = Needs Improvement
- 50–60% = Basic Level Pass
- 61–79% = Intermediate Level Pass
- 80% and above = Advanced Level Pass

# SOFT SKILLS CURRICULUM

The course for developing essential soft skills in the digital age to support future development on the Thai MOOC platform has the following content structure:

Main Topics / Subtopics	Media/Content
Soft Skills Development Course Necessary in the Digital Age to Support Future Development	2 video clips Self-learning content
Leadership <ul style="list-style-type: none"> <li>• Topic: Stay Informed and Adapt to Change</li> <li>• Topic: Possess Initiative</li> <li>• Topic: Have Confidence</li> <li>• Topic: Visionary</li> <li>• Topic: Make Decisions Courageously</li> <li>• Topic: Build Teams and Networks</li> <li>• Topic: Take Responsibility</li> <li>• Leadership Scenario Skills</li> <li>• Post-Learning Assessment</li> </ul>	16 video clips Self-learning content
Growth Mindset <ul style="list-style-type: none"> <li>• Topic: Creative Thinking and Innovation</li> <li>• Topic: Strategic Thinking and Problem Solving</li> <li>• Topic: Analytical Thinking with Critical Reasoning and Differentiating Facts</li> <li>• Topic: Developing the Framework of Growth Mindset</li> <li>• Topic: Steps in Cultivating a Growth Mindset</li> <li>• Case Study on Growth Mindset Thinking Skills</li> <li>• Post-Learning Assessment</li> </ul>	12 video clips Self-learning content

Main Topics / Subtopics	Media/Content
<p>Emotional Intelligence</p> <ul style="list-style-type: none"> <li>• Topic: Ability to Control Emotions and Self-Needs</li> <li>• Topic: Ability to Recognize and Generate Self-Motivation</li> <li>• Topic: Creating Happiness and Satisfaction in Life</li> <li>• Topic: Flexibility Topic: Managing Emotions and Stress</li> <li>• Case Study on Emotional Intelligence Skills</li> <li>• Post-Learning Assessment</li> </ul>	<p>12 video clips Self-learning content</p>
<p>Lifelong Learning</p> <ul style="list-style-type: none"> <li>• Topic: Needs and Components of Learning</li> <li>• Topic: Self-Directed Learning</li> <li>• Topic: Lifelong Learning Topic: Development toward Lifelong Learning</li> <li>• Topic: Strategies for Lifelong Learning to Action</li> <li>• Case Study on Lifelong Learning Skills</li> <li>• Post-Learning Assessment</li> </ul>	<p>12 video clips Self-learning content</p>
<p>Teamwork</p> <ul style="list-style-type: none"> <li>• Topic: Building Relationships with Others</li> <li>• Topic: Effective Communication</li> <li>• Topic: Negotiation and Conflict Resolution</li> <li>• Topic: Good Citizenship</li> <li>• Topic: Empathy</li> <li>• Case Study on Teamwork</li> <li>• Post-Learning Assessment</li> </ul>	<p>12 video clips Self-learning content</p>
<p>Summary of the Essential Soft Skills Development Course for the Digital Era to Support Future Development.</p>	<p>1 video clip</p>

# ONLINE LEARNING AND SOFT SKILLS ASSESSMENT

ONDE has created a website for public relations and dissemination, including soft skills assessment and providing guidance for improving each soft skills.

## Our Website

Those interested can access the project's website at

<https://softskills.onde.go.th/>

or through the QR code provided below.



## Online Course Learning Procedures

For those interested in online course learning and soft skills assessment, you can follow these steps:

1. Register on the our website: <https://softskills.onde.go.th/>
2. Join as a member of Thai MOOC and enroll in the soft skills course on the Thai MOOC website.
3. Upon completing the social skills course, if you score above 75%, you will receive a certificate from Thai MOOC.
4. Log in to the project's website again <https://softskills.onde.go.th/> to request your certificate and receive the soft skills assessment results from ONDE.

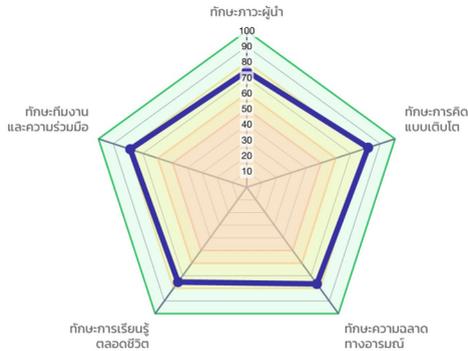
## Example of Soft Skills Assessment Results

The results of the soft skills assessment will be presented as follows:

### ผลการประเมินระดับทักษะทางสังคม

ผลการประเมินของ ผู้ใช้เมล

ทักษะทางสังคม ระดับกลาง



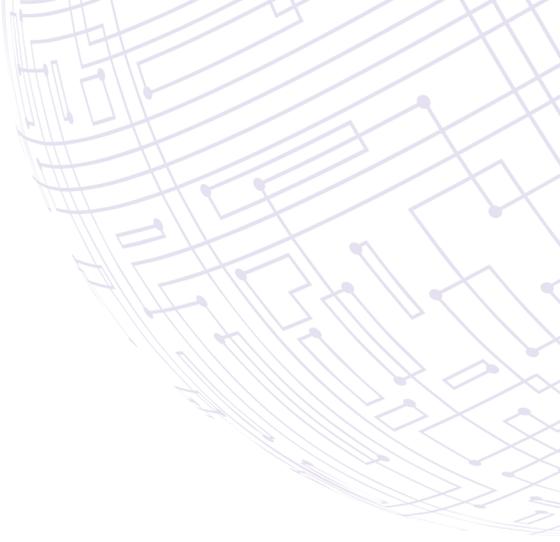
ทักษะทางสังคม	ผลารทดสอบ	ระดับทักษะ
ทักษะภาวะผู้นำ	74.19%	ระดับกลาง
ทักษะการคิดแบบเติบโต	81.82%	ระดับสูง
ทักษะความฉลาดทางอารมณ์	76.47%	ระดับกลาง
ทักษะการเรียนรู้ตลอดชีวิต	75.00%	ระดับกลาง
ทักษะทีมงานและความร่วมมือ	78.57%	ระดับกลาง

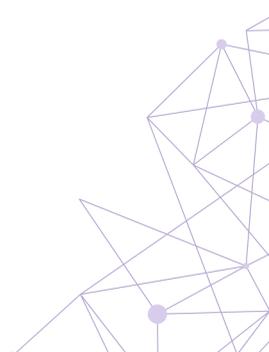
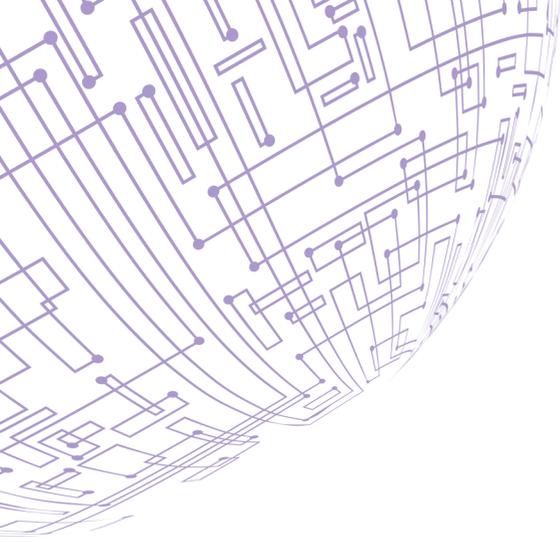
ข้อเสนอแนะในการพัฒนาตนเอง

#### 1. ทักษะภาวะผู้นำ

- พัฒนาทักษะย่อยรู้เท่าทันสถานการณ์และการเปลี่ยนแปลง ให้สามารถวิเคราะห์การเปลี่ยนแปลงของสังคมและแนวโน้มที่จะเกิดขึ้น จูงใจให้ผู้อื่นเห็นคุณค่าของการเปลี่ยนแปลง
- พัฒนาทักษะย่อยมีอุดมการณ์ ให้สามารถแก้ปัญหาด้วยเหตุและผล ไม่ตกเป็นทาสของอารมณ์และอคติ มีจิตใจที่เข้มแข็งหนักแน่นในเหตุผลแห่งความถูกต้อง ความซื่อสัตย์สุจริต และยุติธรรม
- พัฒนาทักษะย่อยมีความเชื่อมั่นในตนเอง ให้สามารถปรับตัวได้ดี แสดงออกอย่างเหมาะสม มีนัยในการกระทำและมุ่งมั่นทำงานงนสำเร็จ ไม่หวั่นไหวเมื่อพบกับปัญหาและอุปสรรค
- พัฒนาทักษะย่อยมีวิสัยทัศน์เชิงรุก ให้สามารถวิเคราะห์ส่วนขยายภายใต้บทบาทหน้าที่ความรับผิดชอบของตน กับเป้าหมายของความสำเร็จที่เป็นประโยชน์กับตนเองและสังคม

The proficiency levels of soft skills in each core skill will be displayed on a radar chart and in the table shown above. Additionally, the system provides recommendations for self-improvement to enhance soft skill levels in each core skill







**Conducted under the project for the study and development of soft skills and digital skills to support future development**

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