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Enhancing Digital Competence

Impacts and Policy Implications from a study in Vietnam

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Foreword

I am thrilled and appreciative to present to you this report entitled "Enhancing Digital Competence: Impacts and policy implications from a study in Vietnam." This study is the culmination of collaborative efforts, dedication, and the support of our research team, research assistants and leaders. I would like to express my sincere gratitude to all the individuals who have contributed to this project. Their expertise and support have been instrumental in bringing this report to fruition.

Upon exploring the contents of this report, we hope you will discover useful insights about the roles of digital competence, especially in the case of a developing country, interesting preliminary findings in the context of Vietnam, and the best practices from various countries. The research aims to emphasize the significance of bolstering digital competence in Vietnam, thereby shaping policy discussions, enabling informed decision-making and propelling meaningful progress. By doing so, our goal is to help improve digital skills for individuals and communities while also fostering the progress of Vietnam in the digital era.

In addition, we genuinely hope that this report acts as a catalyst for further exploration, igniting fresh ideas and inspiring relevant and future government policies as well as future research.

We are appreciative of the valuable input provided by reviewers for this study, who come from a variety of institutions, including provincial and municipal Departments of Information and Communication, universities, and associations like VINASA. We would like to acknowledge the generous support that has made this research project possible. We are grateful for the grants provided by the RMIT Vietnam's Thematic Research Fund, the College of Business and Law's Research Support Scheme, and The Business School, RMIT Vietnam for financial and other research support.

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Executive summary

Digital competence plays a vital role in shaping a thriving digital society. While digital technologies offer access to vast information, effectively utilizing it can be challenging. Digital competence empowers individuals to critically evaluate information, find what they need, and solve problems efficiently. In Vietnam, the economy faces challenges in workforce employability, productivity, and efficiency. To leverage the country's digital advances and overcome these hurdles, enhancing the digital competence of the population becomes imperative.

Prioritizing digital competence will not only address economic challenges but also establish Vietnam as a prominent digital leader in the region. It will accelerate the implementation of the national strategy for digital and green transformation, foster digital civility, and prepare the country for technological mega-trends. This strategic focus promises significant benefits and ensures Vietnam's preparedness for a better future.

To emphasize the importance of bolstering digital competence in Vietnam, the RMIT research team has conducted this study. Our aim is to enable informed decision-making, propel meaningful progress, and shape policy discussions. Through this research, we reveal the role of digital competence, present valuable lessons, and strive to make digital competence accessible to all, empowering individuals, strengthening communities, and driving progress throughout Vietnam.

The report is structured as follows. Part 1 of the report emphasizes the critical role of digital competence, especially in Vietnam's rapidly evolving world. As digital technologies become increasingly integrated into daily life, there is a pressing need for the country to enhance its digital skills. Despite some progress, Vietnam's digital competence in the most recent Global Talent Competitiveness Index (GTCI) remains below the median, requiring a significant push towards improvement. Enhancing digital competence in Vietnam has significant economic impact, fostering innovation, productivity, and job opportunities while addressing structural unemployment. This aligns with the national strategy for digital and green transformation, aiming to seamlessly integrate technology into society and the economy. Improved digital competence enhances governance, efficiency, and citizen participation, combating corruption and promoting competitiveness. Moreover, it supports Vietnam's commitment to achieving Sustainable Development Goals (SDGs) and transitioning to a greener economy. Prioritizing digital competence also prepares citizens for emerging digital mega-trends and fosters responsible and ethical behavior in the digital realm. Recognizing the link between digital competence and human capital development, the government must prioritize this in the national agenda.

Part 2 focuses on the research design and preliminary findings related to digital competence in Vietnam. Adopting the Digital Competence Framework for Citizens (DigComp), the study identifies five key areas and 21 specific competencies essential for navigating the digital age. Data was gathered from 723 Vietnamese citizens using both online and hard-copy questionnaires. The overall proficiency level in digital competence was assessed as average, with the highest scores in information and data literacy and communication and collaboration, and the lowest in digital content creation. The report highlights the importance of education in influencing digital competence levels, providing valuable insights for targeted interventions.

Part 3 explores successful examples of digital competence development programs from four countries: Republic of Korea, Singapore, Estonia, and Finland. Each country's unique approach to digital competence showcases valuable lessons for Vietnam's digital transformation. Republic of Korea emphasizes education and coding from an early age, Singapore's "Smart Nation" program, Estonia's focus on education and technology, and Finland's comprehensive digital support demonstrate the importance of government initiatives, collaboration, and lifelong learning in digital competence development. The common best practices from these countries include:

1. **Education:** Prioritizing digital skills integration, early exposure to coding, and computational thinking.
2. **Government initiatives:** Driving digital competence through comprehensive plans, training, and e-learning.
3. **Digital literacy for all:** Promoting digital literacy for all age groups, including older adults.
4. **Collaboration:** Inclusive digital transformation via public-private collaboration and stakeholder engagement.
5. **Lifelong learning:** Emphasizing continuous learning, subsidizing digital skill upgrades.
6. **Innovation:** Embracing flexibility, design thinking, and innovation for digital society advancement.

Based on the research findings and experiences of other countries, the report presents policy implications for Vietnam's continuous development of digital competence, including:

1. **DigComp for evaluation:** Use DigComp to assess digital competence levels in Vietnam, considering limitations of online self-assessment for all citizens.
2. **Nationwide competence assessment:** Conduct a comprehensive survey to assess digital competence, incorporating AI-related elements from DigComp version 2.2.
3. **Addressing challenges:** Involve IT officers for digital competence assessments, especially in remote areas.
4. **Prioritize training:** Enhance digital proficiency in problem-solving, safety, and content creation through various courses, including Vietnamese Massive Open Online Courses (MOOCs).
5. **Promote DigComp adoption:** Consider adopting tailored DigComp frameworks for education, employability, and organizations.

While the report acknowledges its limitations, including sample representativeness and survey timeframe, it emphasizes the value of future research to understand digital competence better. By prioritizing digital skills and interventions, Vietnam can drive economic growth, improve governance, and create a resilient, sustainable future for the nation. Embracing digital competence is crucial for staying ahead in the 21st century digital landscape and fully harnessing its opportunities.

Part 1

Digital Competence and its roles

1.1 Introduction

In today's rapidly evolving world, the significance of digital competence cannot be overstated. Our daily routines have become deeply intertwined with digital technologies, to the point where computers, tablets, and mobile phones have become indispensable tools in our lives. The internet's accessibility has connected more individuals than ever before, creating a reliance on digital platforms for various aspects of life. As our dependence on digital technologies continues to grow, acquiring essential skills and knowledge becomes crucial for success in both personal and professional spheres. However, despite the widespread adoption of technology, there is an urgent need for citizens to enhance their digital competence. Unfortunately, Vietnam's position in the overall Global Talent Competitiveness Index (GTCI) falls below the median, ranking 74th out of 133 surveyed countries. Moreover, the country's digital skills score stands at 82 out of 133 on the global knowledge scale[1]. These statistics emphasize the pressing need for a substantial push towards digital competence in Vietnam.

> ***"To harness the full potential of the digital revolution, we need to invest in digital skills and ensure that every citizen has the chance to participate in the digital society."***
>
> *- Ursula von der Leyen, President of the European Commission*

Recognizing the intrinsic link between digital competence and human capital development, it becomes imperative for the government's 4.0 industry agenda to prioritize the digital competence of its citizens. This poses significant challenges, particularly in realizing Vietnam's national goals of digital transformation and striving to become a developed country by 2045. Building digital competence extends beyond a short-term training project; it necessitates a comprehensive approach that permeates all aspects of a company and raises numerous questions[2]. As the world undergoes a paradigm shift, Vietnam's aspirations for a digital society require a collective effort to develop digital competence.

This report aims to present the vital roles and urgency for Vietnam to enhance digital competency, providing preliminary findings of the country's digital competence in its specific context. Furthermore, it aims to offer policy insights for navigating the digital landscape, thriving in the digital era, and working towards achieving Vietnam's digital transformation goals.

The report is organized as follows. The next section introduces the concept of digital competence and explores its significant impact on society. It also highlights the crucial importance of digital competence specifically within the context of Vietnam. Part 2 focuses on presenting the key findings from the digital competence survey conducted in Vietnam. Part 3 showcases the successful experiences of five countries in fostering digital competence, followed by an analysis of the policy implications arising from these experiences and the survey findings.

The concept of digital competence

Definition

Digital competence is defined as the range of knowledge, skills, and attitudes required to effectively utilize technology for various purposes[3]. It enables individuals to perform tasks, solve problems, communicate, manage information, collaborate, and create and share content in a manner that is efficient, appropriate, secure, critical, creative, independent, and ethical. By possessing digital competence, individuals can harness the power of technology to enhance their productivity, engage in meaningful interactions, and navigate the digital landscape with confidence and responsibility.

> ***"Digital competence is the foundation for lifelong learning and success in the 21st century economy."***
>
> *- The World Economic Forum*

Vital roles of digital competence

Digital competence plays a pivotal role in driving the success of a digital economy, digital government, and digital society. In the realm of a digital economy, the effective and responsible use of digital technologies is paramount for businesses and individuals alike, as they heavily rely on these technologies for operations and transactions. Digital competence empowers businesses to operate efficiently, foster innovation, and fuel economic growth.

Within the context of a digital government, digital competence assumes critical significance, enabling seamless interaction between citizens and government agencies. It facilitates easy access to services, enhances efficiency, promotes transparency, and encourages citizen participation.

In a digital society, digital competence is indispensable for individuals to carry out tasks, communicate, collaborate, and create content effectively. It equips them with the necessary skills to adapt to evolving technologies and actively engage in the digital world. As the process of digital transformation continues to unfold, the demand for digital competence has witnessed a notable surge, impacting various aspects of our lives, including employment, communication, data usage, and mobile device usage.

To remain ahead in the 21st century's digital landscape and fully harness its opportunities, lifelong learning and a willingness to embrace new ideas are paramount. This is especially relevant in Vietnam. A deeper exploration of the profound effects of digital competence on society and the compelling reasons for its imperatives follow in subsequent sections.

1.2 Profound effects of digital competence on society

There are many positive impacts of digital competence on digital society. Digital technologies can provide access to a wealth of information, but it can be difficult to find and use this information effectively. Digital competence can help people to evaluate information critically, to find the information they need, and to use it to solve problems. The other effects of holding strong digital competence include:

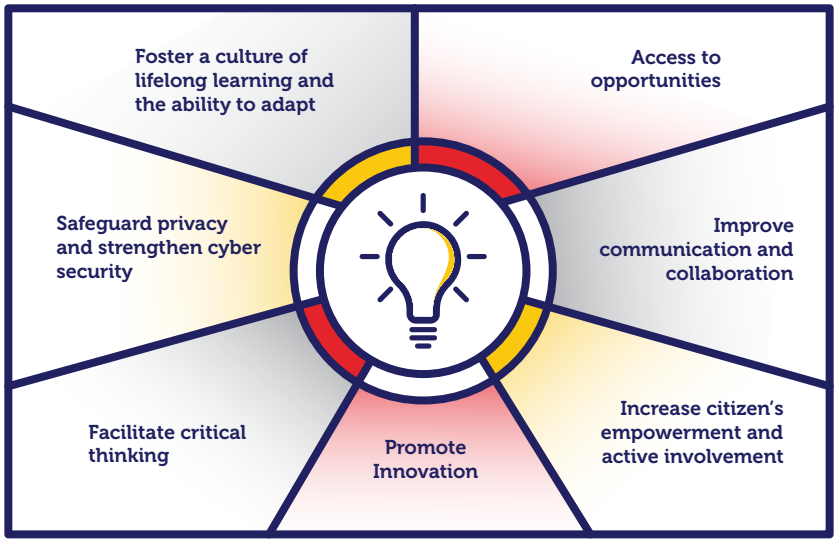
Provide access to opportunities

Digital competence unlocks a myriad of opportunities within the digital realm, empowering individuals to explore a diverse range of possibilities and to actively participate in the digital society. In a digital era, where more and more activities are taking place online, digital competence is essential for accessing opportunities. For example, students can access educational opportunities, such as online courses, tutorials, libraries and scholarships. This can be especially important for those who live in remote areas or who cannot afford traditional forms of education. Employees can find and apply for jobs, as well as perform their jobs effectively and even remotely. In today's digital economy, many jobs require digital skills, so having these skills can give people a competitive edge[4]. Entrepreneurs can start and run their own businesses through utilizing digital technologies to market products and services, reach customers, and manage finances. Governments can use digital platforms to provide services to citizens and make decisions more efficiently. Citizens can participate in civic life, such as filing taxes, renewing licenses, applying for benefits and making their voices heard through multiple digital channels[5]. Digital competence can also bridge the digital divide and overcome barriers related to age, socio-economic status, or educational background, enabling equal opportunities for all[6].

Improve communication and collaboration

Digital competence enables effective communication and collaboration. With digital tools such as email, instant messaging, video conferencing, and project management platforms, individuals can connect with colleagues and collaborators across different locations and time zones. Being proficient in these tools ensures smooth and effective communication, enhancing teamwork and productivity.

Digital competence can help people to be more aware of the different ways that digital technologies can be used to communicate and collaborate. This includes understanding the different platforms and tools that are available, as well as the different ways that these platforms and tools can be used to achieve specific goals. For example, to understand how to use language and nonverbal communication effectively, or how to tailor their communication style to a specific audience. When communication has been facilitated well thanks to technologies and strong digital competence, collaboration between business groups or society will be strengthened accordingly[7]. This includes understanding how to work effectively with others, as well as how to resolve conflict and build consensus.



Increase citizens' empowerment and active involvement

Digital competence empowers individuals to be active participants, rather than passive consumers, in a digital society. It enables them to create, share, and contribute to digital content, express their opinions, and engage in communities. Digital competence allows individuals to have a voice, be informed, and actively shape the digital world around them[8]. Several studies have indicated that higher digital competence is related to better engagement in digital platforms. For education and younger age groups especially, researchers state that schools wanting students to be more engaged in technology-enhanced learning should focus on developing their digital skills[9].

Safeguard privacy and strengthen cyber security

Digital competence is essential for protecting personal privacy and security in a digital society. It involves understanding privacy settings, managing online identities, and being aware of potential cyber threats. Individuals with digital competence can safeguard their personal information, practice safe online behaviours, and protect themselves from digital risks. A systematic evidence review[10], screened through 13 studies about digital skills that impacted children's lives and wellbeing, also concluded that, although there is a link between digital skills and online risks, those with more skills reported less harm after exposure to risks compared with those less skilled.

Facilitate critical thinking

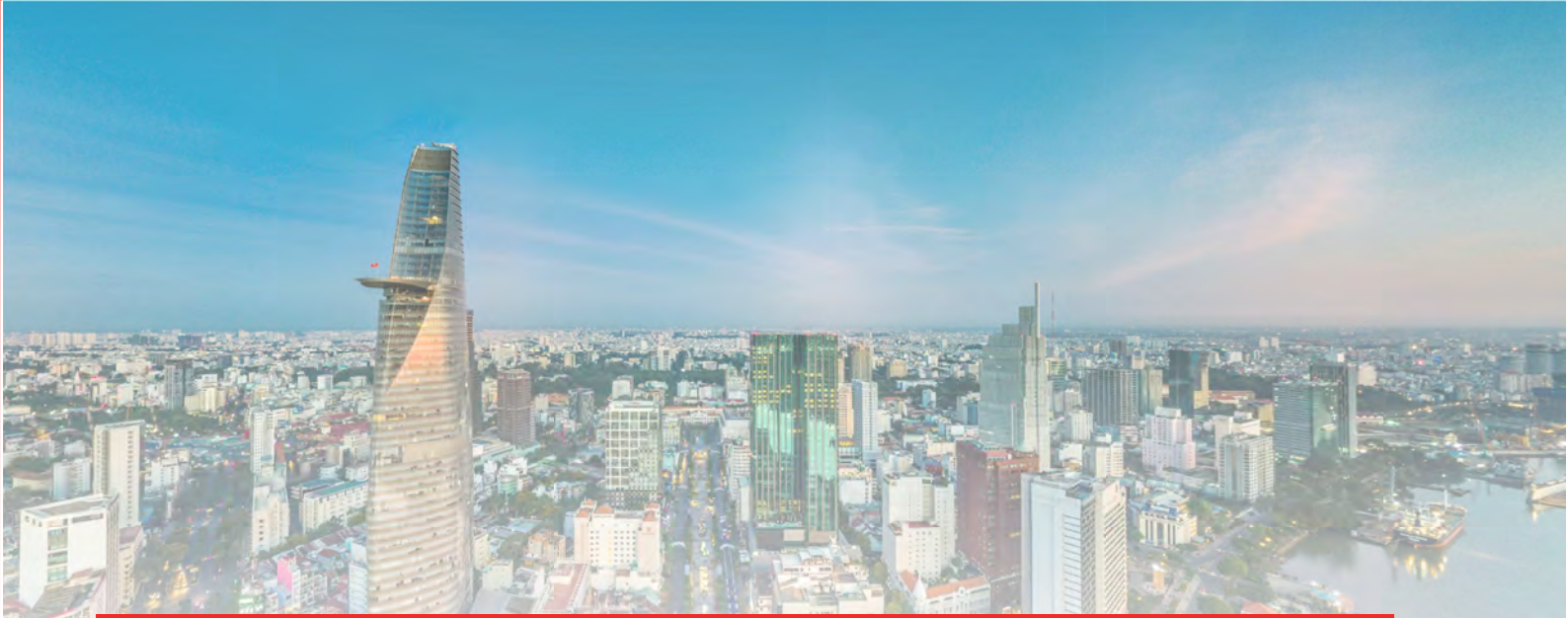
United Nations Conference on Trade and Development (UNCTAD) stressed that digital literacy is such a basic requirement for every citizen to be able to participate in the digital society, regardless of the country's economic development status[11]. In a digital society, there is an abundance of information, much of which may be misleading or inaccurate. Digital competence equips individuals with the skills to evaluate, analyse, and critically assess digital content. It helps in developing digital literacy, distinguishing reliable sources from misinformation or fake news, and making informed decisions in the digital space.

Foster a culture of lifelong learning and the ability to adapt

In a rapidly evolving digital society, digital competence enables individuals to adapt and learn new technologies and tools. It supports lifelong learning, professional development, and staying up-to-date with the latest digital advancements. Digital competence ensures that individuals can keep pace with the changing digital landscape and continue to thrive in a digital society. Research has proved that digital literacy influences development of a positive attitude towards the usage of technology at work and it also significantly affects on adoption of new technologies[12]. There are other findings that both informative literacy and digital literacy have a direct impact on perceived ease of use of technology.

Promote innovation

Digital competence fosters innovation while technology is constantly evolving, and individuals who are digitally competent are better equipped to learn and adapt to new tools, platforms, and technologies. They can leverage emerging technologies to drive innovation, solve problems, and stay ahead in a rapidly changing digital landscape. Digital technologies can be used to create new products, services, and ideas that meet the needs of consumers. This has the potential to drive economic growth and to improve the quality of life. Digital competence helps to promote innovation in a number of ways. For example, to improve existing products and services by making them more efficient, effective, and user-friendly; to create new business models that are more agile and responsive to change; to solve complex problems that would be difficult or impossible to solve without the use of technology.

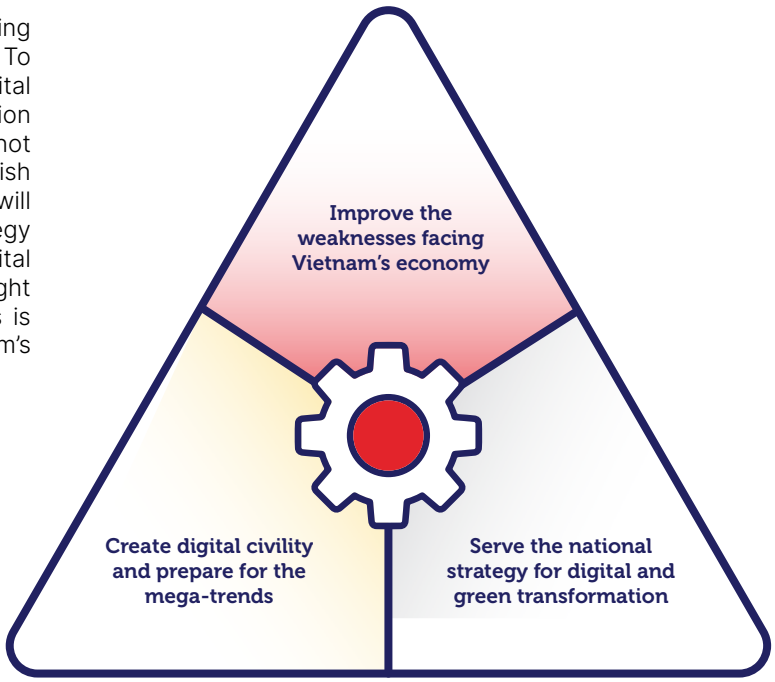


1.3 The imperative of digital competence for Vietnam

Vietnam's economy currently faces challenges concerning workforce employability, productivity, and efficiency. To surmount these hurdles and leverage the country's digital advances, enhancing the digital competence of its population becomes imperative. Prioritizing digital competence will not only address Vietnam's economic challenges and establish its position as a prominent digital leader in the region, it will also accelerate the implementation of the national strategy for digital and green transformation. And it will foster digital civility, preparing the country for the mega-trends brought about by technological advances. This strategic focus is poised to unlock significant benefits and ensure Vietnam's preparedness for a better future.

"Digital competence is not just about knowing how to use technology. It's about using technology to solve problems, create opportunities, and build a better future."

- Carmen Reinhart, World Bank Chief Economist



Overcome challenges of the Vietnamese economy

Employability

In today's digital age, digital competence is essential for job roles because the workplace demands advanced digital skills. Both public and private organizations expect employees to possess these skills due to the increasing reliance on the internet and technology. Without a solid grasp of digital competencies, driving innovation and maintaining competitiveness becomes challenging[13]. Employers require individuals to be proficient in using digital devices and relevant competencies. Strong digital skills enhance employability and create numerous opportunities. Scholars[14] argue that the changing dynamics of trade and the global knowledge economy require different skills for high-value jobs, contributing to lower productivity and exacerbating structural unemployment. In the context of Vietnam, where a significant labor force is still engaged in agricultural activities, there is a shortage of skills and knowledge necessary to effectively perform tasks in the evolving modern business environment, resulting in a considerable proportion of the workforce remaining unemployed[15]. Despite benefiting from a demographic dividend, Vietnam faces persistent structural unemployment primarily due to a shortage of skilled labor, including digital competence, posing a significant obstacle to national development[16].

Productivity and Efficiency

Digital competence empowers individuals to optimize workflows, automate tasks, and enhance productivity in the workplace through effective use of digital tools. This leads to increased efficiency, time savings, and improved work output. Vietnam has faced challenges in labor productivity compared to other countries in Asia. Shortfalls in labor productivity have been observed in sectors like mining, finance, real estate, and other industrial subsectors since the 1990s. Various studies have indicated that labour productivity is typically measured by dividing national output by the number of workers[17]. However, in the case of Vietnam, specific modifications may be needed to account for unique factors. Improving digital competence can be a key factor, as a long-term measure, in addressing the challenges of low labour productivity in Vietnam, enabling individuals and the country to enhance efficiency and strive for increased competitiveness.

Serve the national strategy for digital and green transformation

Build a Digital Society

The Vietnam Prime Minister's Decision 411 in 2022 outlines the goals for digital economy development based on the National Strategy on Digital Economy and Digital Society Development until 2025, with a vision towards 2030[18]. In line with this, the government emphasizes the importance of a seamless integration of digital technology into all aspects of life to create a digital society. This integration fosters new relationships, habits, and cultural norms within the digital environment. Key attributes of a digital society include digital citizenship, digital connectivity, and digital culture. Cultivating cultural values suitable for the digital age, facilitating access to global cultural values, and enriching the spiritual lives of individuals are essential aspects of developing a digital society. Additionally, promoting creativity while safeguarding against risks and threats is vital in this context. The competence of citizens in navigating the digital landscape is crucial for the progress and sophistication of the society. Therefore, the success of the digital society heavily relies on the digital competency of its inhabitants. Addressing the challenges associated with digital competence is paramount to drive the growth of the digital society and achieve the set objectives.

Develop a Digital Economy

In the context of rapid growth of the global digital economy, with the digital economy projected to reach $20.8 trillion by 2025[19], Vietnam has also witnessed remarkable growth in its digital economy in recent years[20], prompting the government to set ambitious targets for the future. The government's Decision 411 defines the digital economy as one that utilizes digital technology and data as key inputs, operating primarily in the digital environment. Its goals for 2030 include a 30% contribution to GDP from the digital economy, with each sector contributing at least 20%. The aim is for e-commerce to account for over 20% of total retail sales, and for 100% of businesses to adopt electronic contract platforms. Additionally, over 70% of SMEs are expected to embrace digital platforms, while the proportion of digital workers in the workforce should exceed 3%. Given the increasing reliance on the internet and digital technologies in our economy, it is crucial for entrepreneurs, business owners, and professionals in Vietnam to possess the necessary digital skills and expertise to effectively leverage digital platforms and tools. Strong digital competence also empowers individuals and enterprises to navigate online marketing, implement e-commerce strategies, analyse data, engage with customers and deploy new business models. These competencies not only drive business growth but also create diverse economic opportunities.

Improve Digital Governance

Digital government is a crucial component of the digital economy, aiming to enhance government efficiency, combat corruption, and promote economic competitiveness. The development of e-government has been challenging globally, including in Vietnam, with concerns about progress compared to peer countries. The active participation of digital citizens is essential for the success of digital government initiatives. However, many projects often prioritize the supply side and neglect the necessary skills on the demand side, leading to low usage of public services. Insufficient training on digital skills for citizens exacerbates these challenges, hindering effective utilization of online services. Therefore, digital competence becomes vital for citizens to engage with digital governance, access government services, participate in e-voting, provide feedback, and contribute to policy discussions. Advanced digital competence empowers citizens to hold governments accountable and actively participate in democratic processes within the digital realm. World Bank researchers highlight digital competence in the workforce as one of the key approaches for successful e-government transformation in Vietnam, alongside process and technology considerations[21].

Advance SDGs and Net-zero Ambitions

Enhancing the digital competency of citizens in Vietnam not only accelerates the achievement of Sustainable Development Goals (SDGs) but also contributes to the nation's goal of achieving net-zero emissions by 2050. The government of Vietnam, committed to the Net-Zero emissions at Cop-26, has established the national steering committee with action plans to implement this commitment[22]. With enhanced digital skills, individuals can actively participate in renewable energy, sustainable transportation, and eco-friendly practices, optimizing energy consumption and adopting clean technologies. Increased digital literacy empowers citizens to access digital platforms, fostering information sharing, collaboration, and collective action for SDGs and net-zero targets. By bolstering digital competency, Vietnam strengthens its capacity to transition to a sustainable, low-carbon economy, paving the way for a greener and more resilient future.

Create digital civility and prepare for mega-trends

Digital competence extends beyond technical skills and encompasses responsible and ethical behaviours, including digital etiquette, safeguarding online privacy, implementing security measures, and being aware of potential risks and threats, promoting digital civility. Developing digital competence is essential for individuals to protect themselves and others in the digital area. However, Vietnam faces challenges in terms of digital competence, as evident from its low ranking in the Digital Civility Index (DCI) conducted by Microsoft[23]. This emphasizes the need to improve the promotion of responsible online behaviours and address instances of unethical conduct.

Moreover, Vietnam's digital economy is influenced by various megatrends[24], such as the emergence of new digital technologies, the growing importance of cybersecurity and privacy measures, the establishment of modern digital infrastructure, the advancement of smart and sustainable cities initiatives, the expansion of digital skills, services, gigs, and entrepreneurship, and evolving consumer behaviors shaped by digital tribes and influencers. Proactively and effectively addressing these trends is crucial for fostering a thriving digital economy in Vietnam. In light of these circumstances, there is an urgent requirement to prioritize and prepare the population with the appropriate level of digital competence. This will enable individuals to navigate the digital landscape responsibly and leverage the opportunities presented by these megatrends.

In summary, Vietnam's economy faces challenges in employability and productivity, which can be improved through digital competence. The government aims to build a digital society and advance the digital economy, requiring strong digital skills for citizens and businesses. Digital competence is also crucial for effective digital governance and achieving sustainable development goals. It prepares Vietnam for upcoming digital mega-trends. Enhancing digital competency empowers individuals, promotes responsible online behavior, and contributes to the nation's net-zero emissions goal. Prioritizing digital skills is essential for driving economic growth and creating a resilient, sustainable future for Vietnam.

Part 2

Preliminary Findings from Digital Competence assessment for citizens in Vietnam

2.1 Research design

This study adopts the Digital Competence Framework for Citizens (or DigComp). The first version, which incorporates the knowledge, skills, and attitudes of the citizens, was introduced in 2013 by the European Commission as the European Digital Competence Framework for Citizens. The framework aims to help European citizens equip themselves with competences in today's digital age. Competences include how to assess information, communicate via technological tools, and manage digital content and the risks of operating online[25],[26]. To date, multiple versions (see Appendix 1) of DigComp have been published, with each integrating updates and modifications over the last. The latest version, DigComp 2.2, published in 2022, includes emerging technologies like Artificial Intelligence, the Internet of Things, and datafication, as well as new developments such as the rise of teleworking, which has resulted in increased demands for digital skills from individuals.

DigComp framework identifies the key components of digital competence in the five areas and 21 specific competences summarised below:

Area	Competence
Information and Data Literacy	1.1 Browsing, searching, and filtering data, information, and digital content
	1.2 Evaluating data, information, and digital content critically
	1.3 Managing data, information, and digital content effectively and ethically
Communication and Collaboration	2.1 Interacting through digital technologies
	2.2 Sharing information and content through digital technologies
	2.3 Engaging in citizenship through digital technologies
	2.4 Collaborating through digital technologies
	2.5 Netiquette
	2.6 Managing digital identity
Digital Content Creation	3.1 Developing digital content
	3.2 Integrating and re-elaborating digital content
	3.3 Copyright and licenses
	3.4 Programming and computational thinking
Safety	4.1 Protecting devices
	4.2 Protecting personal data, and privacy
	4.3 Protecting health and well-being
	4.4 Protecting the environment
Problem Solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3. Creatively using digital technologies
	5.4 Identifying digital competence gaps and acquiring new digital skills.

Figure 1. Five areas of DigComp [26]

The general assessment purposes of each of five areas are provided as follows:

(1) Information and Data Literacy: to articulate information needs, to search for data, information, and content in digital environments, to access and navigate between them, to create and update personal search strategies.
(2) Communication and Collaboration: to interact through a variety of digital technologies and to understand appropriate digital communication means for a given context.
(3) Digital Content Creation: to create and edit digital content in different formats, to express oneself through digital means.
(4) Safety: to protect devices and digital content, and to understand risks and threats in digital environments, to know about safety and security measures and to have a due regard to reliability and privacy.
(5) Problem solving: to identify technical problems when operating devices and using digital environments, and to solve them.

DigComp 2.1 was adapted in this report. This adaptation to the Vietnamese context is justified for three reasons:

1. It was the most updated and comprehensive framework on digital competence (at the time the survey was conducted);
2. It was designed for career development and a lifelong-learning society, aligning with the goals of Vietnam's National Digital Transformation Programme; and
3. It was widely accepted and adopted across European nations.

We have implemented a scoring system aligned with the proficiency levels in DigComp. A score of 1 indicates the basic level, score 2 indicates the intermediate level, and score 3 indicates the advanced level. Additionally, a score of 0 represents proficiency below the basic level.

Element	Statement	Score
Knowledge	I have no knowledge of this / I never heard of this	0
	I have only a limited understanding of this and need more explanations	1
	I have a good understanding of this	2
	I have fully mastered this topic / issue and I could explain it to others	3
Skills	I don't know how to do it	0
	I can do it with help	1
	I can do it on my own	2
	I can do it with confidence and, if needed, I can support/guide others	3
Attitude	Not at all	0
	Not much / very little	1
	Yes / Yes, I am / Yes, I do	2
	Very much	3

Table 1. Response options for digital assessment tool

The study aims to gather data from a diverse group of Vietnamese citizens. To achieve this, the researchers used both an online questionnaire (using the Qualtrics platform) and hard-copy questionnaires. A total of 755 citizens participated in the survey from June to September of 2021, with respondents from various provinces/cities: Ho Chi Minh City, Binh Phuoc, Can Tho City, Binh Duong, Ha Noi, Dak Nong, and other locations. The selection of these localities was based on provincial digital transformation rankings (DTI), published in 2021 in Vietnam (https://dti.gov.vn/). After eliminating cases where the questionnaires were incomplete or the participants spent less than ten minutes, the sample size is 723.

While the sample size may not represent the entire population of Vietnam, the survey outcome yields intriguing findings, including variations in age, gender, education, location, and sector. We hope these findings offer valuable policy insights and lay the groundwork for future, more extensive research. The following section presents the preliminary findings.

2.2 Findings

In terms of demographics, the survey results indicate that 47% of the respondents belong to the age group of 18-24 years, whereas approximately 6% are aged 55 years or above. The study also revealed a higher representation of female participants (52%) compared to males (48%). In relation to education, a significant majority (73%) of the participants have completed undergraduate degrees. Furthermore, the distribution of participants across public and private sectors is relatively balanced.

Figure 2 presents the essential descriptive statistics regarding proficiency levels in the five digital competence areas:

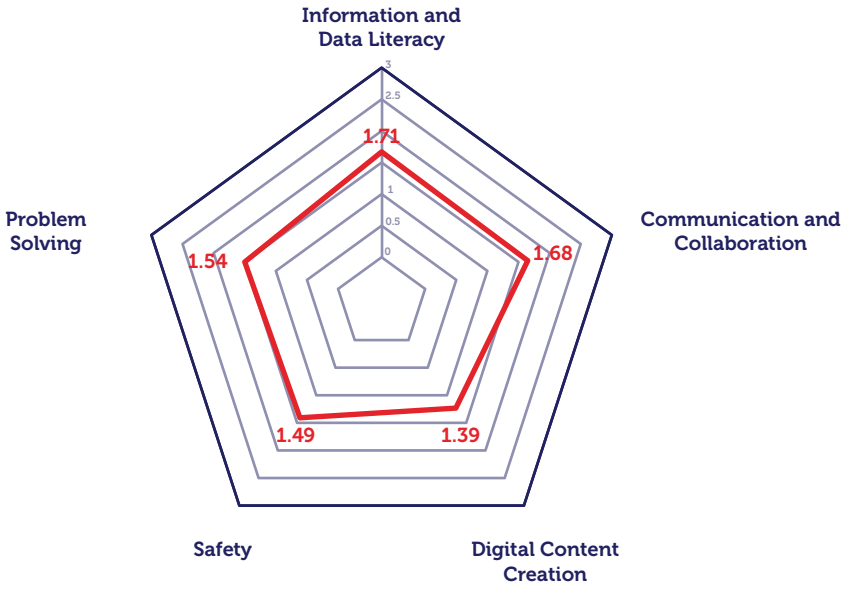


Figure 2. Proficiency levels in the five digital competence areas (N=723)

- The average proficiency level in digital competence falls within the basic level, scoring 1.56 (out of 3.00).
- The individual competence areas demonstrate varying scores, ranging from 1.39 to 1.71.
- Noteworthy are the highest scores achieved by respondents in information and data literacy (1.71), as well as communication and collaboration (1.68).
- Problem-solving receives a score of 1.54, closely followed by safety at 1.49.
- The lowest score is obtained in digital content creation, scoring only 1.39.

The survey results align to an extent with those of European Union (EU) countries that utilized DigComp to assess the digital competence of their citizens. For instance, Finland, which ranks fifth on the digital scoreboard of the European Commission, demonstrates citizens with foundational skills in all five key digital competencies. Notably, the country excels in information and data literacy but faces challenges in problem-solving, particularly in identifying and resolving technical issues related to software, hardware, and configuring applications and devices based on personal preferences[27].

Figure 3 depicts the distribution of proficiency levels of digital competence among the respondents in the survey. Key findings include:

- There are 62.4% of respondents who have attained the basic proficiency level.
- Approximately 22.4% exhibit an intermediate level of proficiency.
- A notable 0.4% have achieved an advanced proficiency level.
- The remaining 14.8% fall into other categories, indicating a lack of knowledge, skills, or attitude in the subject matter.

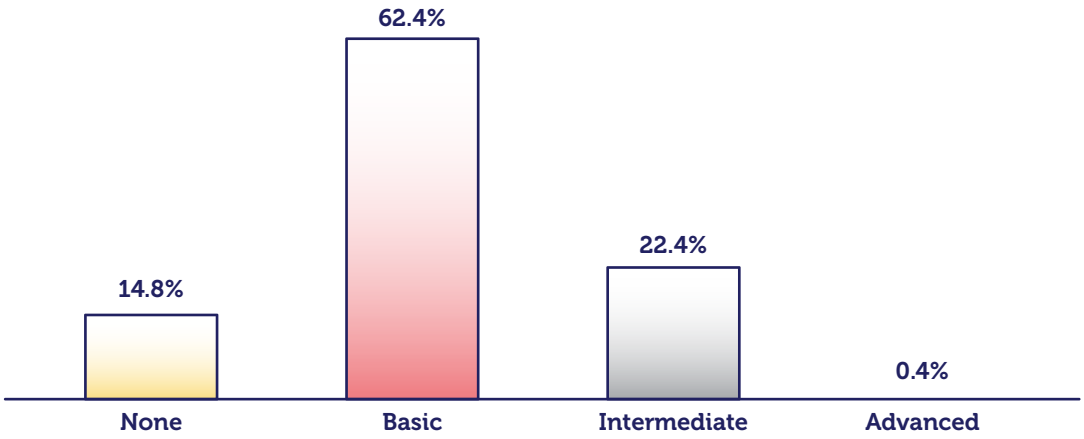


Figure 3. Distribution of proficiency levels

Upon further examination of the data outcomes, the following confirmation emerges:

- Participants with education beyond high school consistently exhibit significantly higher proficiency across all five areas.
- Males generally outperform females in all five areas, although the extent of the difference varies.

Overall, the data collected provides insights into the proficiency levels of the surveyed citizens across the digital competence areas, highlighting the prevalence of basic proficiency while showcasing a smaller percentage of individuals at intermediate and advanced levels.

Area of digital content creation

Due to space constraints, we have chosen to focus on one specific area of the assessment: digital content creation, which received the lowest score. The following findings are noteworthy and may have policy implications, especially regarding Vietnam's national digital transformation strategy in 2023 and beyond.

- The highest scores in digital content creation are achieved by individuals living in urban areas (1.52). These individuals benefit from targeted support and training programs that help enhance their digital content creation abilities.
- Individuals with an education level above high school attain a relatively high score (1.50), indicating that those with advanced degrees exhibit greater proficiency in producing high-quality digital content due to their enhanced education and training. On the other hand, individuals with a "below high school" education level attain a lower score (0.89), suggesting potential challenges or limited skills in digital content creation among this group.
- Respondents in the public sector achieve a higher score (1.43) compared to those in other sectors (1.33) for digital content creation, indicating that the public sector may provide more conducive environments for developing these skills.
- The age group of 18-34 demonstrates a relatively high proficiency score (1.51) in digital content creation, likely owing to their familiarity with digital tools and platforms. Conversely, the age groups of 35-54 and above 54 obtain comparatively lower scores, 1.32 and 0.65, respectively, suggesting that these individuals may encounter challenges or possess less experience in creating digital content.
- In terms of gender, both genders exhibit relatively similar scores, with males slightly outscoring females (1.42 compared to 1.36). It is important to note that this analysis only considers two gender categories (male and female), and there may be other gender identities not captured in this data.
- Generally, younger individuals, those with higher educational attainment, individuals in urban areas, and those in the public sector tend to possess better digital content creation skills. On the other hand, older individuals, those with lower levels of education, individuals in more remote areas, and those in the other sectors may benefit from targeted support and training to enhance their digital content creation abilities.

Overall, these findings provide valuable insights into the proficiency levels and factors influencing digital content creation, aiding policymakers in tailoring interventions to support specific groups and foster digital competence across the country.

Part 3

International experience and policy implications for Vietnam

3.1 Digital competence development programs: examples from other countries

> *"In today's world, digital competence is not a luxury. It's a necessity. If you don't have it, you're at a disadvantage."*
>
> *- Bill Gates, Co-founder of Microsoft*

In this section, some success stories on digital competence development of several countries will be listed. Based on the UN's E-Government Development Index[28] and INSEAD's Global Talent Competitiveness Index[1], we are introducing two Asian countries, Republic of Korea and Singapore, and two representatives from Europe, Estonia and Finland. These are the world powerhouses of technologies and digital transformations in 21st century and have demonstrated different pathways towards the digital society.

Republic of Korea – How the country became a world ICT leader

Republic of Korea has made significant efforts to enhance digital competence among its citizens. Education is highly prized in the country; it is seen as essential for success in the digital economy. The government has introduced coding education in schools from an early age and has invested in various initiatives such as coding boot camps and coding competitions. The country has also implemented programs to promote digital literacy among older adults, recognizing the importance of including all age groups in the digital society[29]. Here are the highlights from experience of the country:

- Education is highly valued for success in the digital economy.
- Since 1996, the country has implemented three main plans to enhance infrastructure and the ICT, to build-up capacity for teachers, and then to create sustainable e-learning environments[30].
- The whole country effort was driven by the synergy of the Ministry of Education, Science, and Technology, Korea Education and Information Service, and 16 Metropolitan Provincial Offices of Education.
- The education system focuses on traditional subjects like mathematics and science, but in the modern ways, by integrating ICT in every classroom and at all levels.
- The set of 21st century skills comprises critical thinking and problem-solving, collaboration, character, and communication and computational thinking[31].
- The country has also implemented programs to promote digital literacy among older adults, recognizing the importance of including all age groups in the digital society[29].

Singapore: empowering senior citizens to embrace digital technology

In Singapore, nurturing domestic talent and attracting talent from around the world have played pivotal roles in driving the economy forward. Notably, the nation stands as a global frontrunner in Global Knowledge Skills, occupying the highest positions in both sub-categories: High-Level Skills and Talent Impact[1]. Singapore has implemented several initiatives to develop digital competence at various levels. The country has a national program called "Smart Nation" that aims to harness technology for social and economic development. Initiatives include coding programs in schools, digital skills training for adults, and public campaigns to promote digital literacy and cybersecurity awareness. Singapore also encourages lifelong learning and provides subsidies for individuals to upgrade their digital skills. During the Covid-19 pandemic, the Singapore Digital Office launched programs like Seniors Go Digital and Hawkers Go Digital to train senior citizens and help stallholders embrace digital tools and e-payments[32]. Some highlights from these successful efforts that other digital leaders can learn from are:

- Embracing design thinking to produce user-centric solutions. This means understanding the user experience and being able to put themselves in the shoes of citizens.
- Collaboration to be open, with a wider set of stakeholders. This is because the challenge of inclusive digital transformation is too big for governments to solve on their own. Working with the public and private sectors can harness the resources and capabilities needed to make progress.
- Humility and an open mindset. The digital domain is constantly evolving, so it is important to be aware of what we do not know. Rather than trying to develop all the solutions at the start, the approach needs to be flexible and adaptable to solve problems.

Estonia: the story of the world's most advanced digital society

Estonia is renowned for its strong focus on digital competence development. The country has implemented several initiatives, including the introduction of digital literacy courses in schools, coding classes for students, and the widespread use of digital platforms for government services. The Tiger Leap project was a major milestone in Estonia's journey to become a digital society, and it has had a lasting impact on the country's development[33]. Several other programs have also played a significant role in Estonia's success, and they continue to contribute to the country's digital transformation[34].

- 1996: The Tiger Leap project is launched by the Estonian government to invest in the development and expansion of computer and network infrastructure in the country, with a particular emphasis on education.
- 2001: The Tiger Leap Plus program is launched as a follow-up to the Tiger Leap project. The main goal of the Tiger Leap Plus program is to further improve the ICT infrastructure in Estonian schools, and to focus on the development of electronic educational materials and the training of teachers in ICT.
- 2012: The ProgeTiger and IT Academy programs are launched. ProgeTiger is designed to improve the technological literacy and digital competence of teachers and students, while the IT academy is a cooperation and development program between the state, the ICT sector companies, and universities, aimed at improving the quality of higher ICT education.
- 2014: The Digital Focus Program is launched by the Estonian government. The program aims to further strengthen Estonia's digital society by focusing on the development of digital infrastructure, digital skills, and digital services, which is also known as the Lifelong Learning Strategy 2020.

The Tiger Leap project is a testament to the Estonian government's commitment to education and technology, and it has had a lasting impact on the country's development. The project is a model for other countries that are looking to become digital societies.

Finland: revolutionizing services with digital and population data

Finland's comprehensive approach to digital competence development includes integrating digital skills and computational thinking into the education system. The Digital and Population Data Services Agency (DVV) ensures accessible digital support for all individuals. The annual Digital Skills Report by DVV reveals that 79% of Finns have basic digital skills, while 84% believe they can manage digitalization in the next five years. However, 39% occasionally require help with internet and digital devices, and 14% feel less confident online. This has emphasized that continuous learning and digital courage are essential for keeping pace with evolving digital skills and technologies. Here are some key insight from the Finns' actions:

- Finland prioritizes digital competence in its education system, integrating across various subjects and promoting coding and programming skills from an early age. Teacher training programs ensure educators are equipped with necessary digital competencies.
- The Digital and Population Data Services Agency (DVV) in Finland develops digital support and aims to make it accessible to all individuals, regardless of location or background. DVV focuses on customer-oriented digitalization and information transfer between different systems. It also provides notary public services, civil marriages, trade confirmations, and tasks related to elections and referenda[35].
- The annual Digital Skills Report by DVV provides insights into Finland's digital competence. It is based on 45 indicators measuring the digitalization of society, digital experiences, and competence of individuals[36].
- Strong digital skills may still require occasional assistance, particularly in matters with significant life impact. Constantly evolving digital skills necessitate a willingness to learn, to try new devices, and to embrace new services. Adapting to digital life depends on our courage to explore and acquire new skills[37].

Overall, these countries share common lessons that other countries such as Vietnam can learn from. By incorporating these lessons, countries can work towards enhancing their digital competence and building advanced digital societies. Below are the common lessons learned from these four countries' digital competence development:

1. **Value of education:** All four countries recognize the significance of education in preparing their citizens for the digital economy. They prioritize integrating digital skills into their education systems and emphasize the importance of early exposure to coding and computational thinking.
2. **Government initiatives:** The governments in these countries play a vital role in driving digital competence development. They implement comprehensive plans, programs, and initiatives to enhance infrastructure, provide training for educators, and create sustainable e-learning environments. The synergy between different government agencies and local authorities is crucial for successful implementation.
3. **Digital literacy for all age groups:** The countries understand the importance of digital inclusion and ensuring that people of all age groups have access to digital literacy programs. They actively promote digital literacy among older adults and provide training and support to help them embrace digital tools and technologies.
4. **Collaboration and stakeholder engagement:** Collaboration between the public and private sectors, as well as involving a wider set of stakeholders, is crucial for inclusive digital transformation. These countries emphasize collaboration to leverage resources, capabilities, and expertise from different sectors, leading to more comprehensive and impactful initiatives.
5. **Lifelong learning**: Continuous learning is emphasized as a key component of digital competence development. The countries encourage lifelong learning and provide subsidies or support for individuals to upgrade their digital skills. They recognize that digital skills are constantly evolving and require a willingness to adapt and to acquire new knowledge.
6. **Innovation and flexibility:** Embracing innovation and being adaptable to change are essential for successful digital transformation. These countries demonstrate a willingness to explore new technologies, solutions, and services. They prioritize design thinking, open-mindedness, and flexibility to solve problems and meet the evolving needs of their digital societies.

3.2 Policy implications for the continuous development of digital competence for Vietnamese citizens

Apply the DigComp framework to evaluate digital competence levels of citizens in Vietnam

This report confirms the appropriateness of adopting the DigComp framework to measure the digital competences of Vietnamese citizens. However, the self-assessment tool via an online platform appears to have limitations in terms of widespread adoption among citizens, especially those residing in remote areas with limited internet access. Additionally, the questions in the DigComp framework designed for generic citizens may not be suitable for highly tech-savvy individuals. As such, implementing DigComp at work could serve as an alternative for targeting high-tech citizens.

> *"Digital competences are necessary in all aspects of life, whether they are social or personal, relate to labour or leisure, in any sector, public or private."*
>
> *- All Digital Manifesto (2019)*

Establish a nationwide digital competence assessment for informed policymaking and training program development

The development of a digital competence framework for citizens offers valuable insights into identifying the necessary digital skills, knowledge, and attitudes required for promoting an inclusive digital nation through educational and training programs. This research aims to validate the suitability of the DigComp framework within the specific context of Vietnam, acknowledging the limitation of reaching a diverse range of Vietnamese citizens. Therefore, it is recommended to conduct a comprehensive nationwide survey to accurately assess the digital competence of all Vietnamese citizens. Furthermore, these studies could explore the integration of AI-related elements derived from the latest version of the DigComp framework, version 2.2.

Address digital competence assessment challenges for hard-to-reach populations

The widespread adoption of the online self-assessment instrument appears to be limited among citizens, particularly those residing in remote areas with limited internet access or individuals from underrepresented age, education, or disability groups. To address this issue, the assistance of information technology officers could be an effective approach to conducting digital competence assessments for citizens, considering their presence in every village in Vietnam to prepare for the development of national digital transformation.

Prioritize training programs to improve digital proficiency in problem-solving, safety, and digital content creation among Vietnamese citizens

The digital competence areas of problem-solving, safety, and digital content creation among Vietnamese citizens can be enhanced through various courses, including programming, critical thinking, computation sciences, cybersecurity, data privacy, graphic design, social media marketing, video editing, and more. These courses are available on online platforms such as Coursera, Udemy, EdX, and FutureLearn, some of which offer free access or require payment for certification. However, most of these global online courses are currently provided in English only. To address local learners, many countries have promoted Massive Open Online Courses (MOOCs) in the local language. In Vietnam, this effort is outlined in Decision 411/QD-TTg of 2022, which approves the national strategy for the development of the digital economy and digital society by 2025, with a vision towards 2030. As part of this strategy, MOOCs will be developed in Vietnamese to provide online learning opportunities in digital competences for all Vietnamese citizens.

Promote the adoption of DigComp frameworks in various contexts

The European Digital Competence Framework has successfully addressed various contexts, not only for citizens at large, but also for specific sectors such as education, employability, and educational organisations, like DigCompEdu, DigComp at work, and DigCompOrg, respectively. Vietnam could consider adopting the diverse DigComp frameworks.

3.3 Limitations and future research

While this research has provided valuable insights, it is important to acknowledge its limitations. Firstly, despite our careful selection of provinces using DTI ranking to ensure representation from various groups, the sample may not fully encompass the diversity of Vietnam. Additionally, the high level of education among participants may have resulted in a skewed distribution of findings. Furthermore, as the survey was conducted in 2021, it did not incorporate the most updated version of DigComp, which has additional questions on the latest technologies.

Future studies should address these limitations by adopting larger-scale and more representative sampling methodologies. Additionally, it is crucial to expand the framework beyond citizens and conduct studies tailored to other sectors, industries and professions. This will provide a more comprehensive understanding of digital competence in Vietnam and its application across diverse contexts.

Comments from Experts

MAI LIÊM TRỰC
PhD

Former Deputy Minister
Ministry of Posts &Telecommunications

"In the future, many traditional jobs will change or disappear, replaced by new jobs that require digital skills and technological knowledge."

VU MINH KHUONG
Associate Professor

Lee Kuan Yew School of Public Policy
National University of Singapore

"Digital competence, shaped by digital vision, a digital mindset, digital skills, and access to digital enablers, stands as a crucial factor for individuals to flourish in the digital age. The research findings and policy recommendations arising from this study furnish a valuable roadmap for elevating digital competence across all segments of Vietnamese society. This, in turn, will propel the nation's progress on the path to prosperity in the decades ahead."

HO TU BAO
Professor

Vietnam Institute for Advanced Study in Mathematics.
Professor of Japan Advanced Institute of Science and Technology (1993-2018)
and Professor Emeritus from 2018.

"To change the way of living and working in the digital environment, specifically through digital transformation, we need to possess digital competences. This report is one of the first valuable resources concerning digital competence connected to the context of Vietnam, and it will surely bring value to its readers."

VO THI TRUNG TRINH

Vice Director of Department of Information and Communications
Ho Chi Minh City

"Digital capability is not only an important supporting factor but also a key pillar of the digital era."

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Appendix 1

- **DigComp 1.0:** This was the initial version of the DigComp framework published in 2013 by the European Commission. It outlined 21 competences across five areas: Information and Data Literacy, Communication and Collaboration, Digital Content Creation, Safety, and Problem-Solving.
- **DigComp 2.0:** Released in 2016, DigComp 2.0 expanded on the previous version and provided a more detailed and comprehensive framework, introducing new terminology, and simplifying the descriptors. Additionally, the current document provides illustrations of the practical applications of DigComp at the European, national, and regional levels.
- **DigComp 2.1**: In 2017, an updated version called DigComp 2.1 was released, making minor revisions to the original DigComp 2.0 framework. The modifications were made to enhance the clarity and usability of the framework.
- **DigComp SAT** refers to the Digital Competence Self-Assessment Tool, based on the DigComp 2.1. It is an interactive online tool developed by the European Commission to help individuals assess their digital competences based on the DigComp framework.
- **DigComp 2.2:** In 2022, the update considers the inclusion of emerging technolgies like Artificial Intelligence, the Internet of Things, and datafication, as well as new developments such as the rise of teleworking, which has resulted in increased demands for digital skills among individuals.

References

[1] B. Lanvin and L.-F. Monteiro, "The Global Talent Competitiveness Index 2022: The Tectonics of Talent: Is the World Drifting Towards Increased Talent Inequalities?," INSEAD, Fontainebleau, France, 2022. [Online]. Available: https://www.insead.edu/faculty-research/publications/reports/global-talent-competitiveness-index-2022-tectonics-talent

[2] P. Ramin, Ed. Digital Competence and Future Skills: How companies prepare themselves for the digital future. Carl Hanser Verlag GmbH Co KG., 2022.

[3] A. Ferrari, Digital competence in practice: An analysis of frameworks (p. 82116). Luxembourg: Publications Office of the European Union, 2012.

[4] "Digital skills critical for jobs and social inclusion," UNESCO, 15 Mar 2018, [Online]. Available: https://www.unesco.org/en/articles/digital-skills-critical-jobs-and-social-inclusion

[5] J. Stofkova, A. Poliakova, K.R. Stofkova, P. Malega, M. Krejnus, V. Binasova, N. Daneshjo, Digital Skills as a Significant Factor of Human Resources Development. Sustainability 2022, 14, 13117. https://doi.org/10.3390/su142013117

[6] Policy Brief No. 92. "Leveraging digital technologies for social inclusion," United Nations, Department of Economic and Social Affairs, 2021. [Online]. Available: https://www.un.org/development/desa/dspd/wp-content/uploads/sites/22/2021/02/PB_92-1.pdf

[7] G. Levitt, The truth about collaborating: Why people fail and how to succeed. Business Expert Press, 2020.

[8] P. Sánchez-Antolín, F. Ramos-Pardo, and M. García, "From digital competence to the civic engagement," presented at the EDULEARN12 Conference, Barcelona, Spain, 2012. [Online]. Available: https://www.academia.edu/2001726/from_digital_competence_to_the_civic_engagement

[9] N. Bergdahl, J. Nouri, and U. Fors, "Disengagement, engagement and digital skills in technology enhanced learning," Education and Information Technologies, vol. 25, no. 2, pp. 957–983, 2019. doi:10.1007/s10639-019-09998-w.

[10] S. Livingstone, G. Mascheroni, and M. Stoilova, "The outcomes of gaining digital skills for young people's lives and wellbeing: A systematic evidence review," New Media & Society, vol. 25, no. 5, pp. 1176–1202, 2021. doi:10.1177/14614448211043189.

[11] "Digital skills are not optional in today's tech-savvy world," UNCTAD, 15-May-2018. [Online]. Available: https://unctad.org/news/digital-skills-are-not-optional-todays-tech-savvy-world

[12] S. Nikou, M. De Reuver, and M. Mahboob Kanafi, "Workplace Literacy Skills—how information and digital literacy affect adoption of digital technology," Journal of Documentation, vol. 78, no. 7, pp. 371–391, 2022. doi:10.1108/jd-12-2021-0241.

[13] "Digital Economy and Society Index (DESI) 2022 Human Capital." European Commission, 2022. [Online]. Available: https://ec.europa.eu/newsroom/dae/redirection/document/88765

[14] W. Cunningham and O. Pimhidzai, "Vietnam's Future Jobs," World Bank: Washington, DC, USA, 2018.

[15] D. Maruichi and M. Abe, "Corruption and the business environment in Vietnam: Implications from an empirical study," Asia & the Pacific Policy Studies, vol. 6, no. 2, pp. 222-245, 2019.

[16] J. Walsh, B. Schrage, T. Q. Nguyen, "Opening of the Vietnamese Economy: Achievements and Challenges," The Political Economy of Vietnam's Industrial Transformation, pp. 15-39, 2021, doi: 10.1007/978-981-16-0151-4_2

[17] "Statistics on labour productivity," International Labour Organization, ILOSTAT. [Online]. Available: https://ilostat.ilo.org/topics/labourproductivity/ (accessed Jul. 1, 2023).

[18] Vietnam Prime Minister (2022). "Decision No. 411/QĐ-TTg. Approval for the national strategy for development of digital economy and digital society by 2025, orientation towards 2030." Vietnam Government Portal. [Online]. Available: https://datafiles.chinhphu.vn/cpp/files/vbpq/2022/03/411-qd-ttg.signed.pdf

[19] Z. Hayat, "Digital trust: How to unleash the trillion-dollar opportunity for our global economy," World Economic Forum, 17 Aug 2022b. [Online]. Available: https://www.weforum.org/agenda/2022/08/digital-trust-how-to-unleash-the-trillion-dollar-opportunity-forour-global-economy/

[20] Google, Temasek, Bain & Company (2022). e-Conomy SEA 2022: Through the waves, towards a sea of opportunity. Retrieved 15 March 2023, from https://economysea.withgoogle.com/intl/ALL_vn/report/

[21] "Digital Government Transformation & Data-driven decision making," – Vietnamese version, Australian Aid Worldbank, 16 Dec 2021. [Online]. Available: https://thedocs.worldbank.org/en/doc/7d206effa302b5cb33fee6e8f9a30b43-0070012021/original/Vietnam-Digital-Government-Transformation-VIE.pdf

[22] Vietnam Government Office (2022). "Notification no. 30/TB-VPCP. Conclusion of the Prime Minister - Head of the National Steering Committee at the first meeting of the national steering committee of the fulfillment of Vietnam's commitments in the 26th conference of the parties to the United Nations framework convention on climate change." Vietnam Government Portal. https://vpcp.chinhphu.vn/van-ban-ban-hanh/172325.htm

[23] "Vietnam needs to make more efforts in building a civilized cyberspace," – Vietnamese version, Microsoft, 19 Feb 2020. [Online]. Available: https://news.microsoft.com/vi-vn/2020/02/19/viet-nam-can-no-luc-hon-trong-viec-xay-dung-mot-khong-gian-mang-van-minh/

[24] A. Cameron, T. H. Pham, J. Atherton, D. H. Nguyen, T. P. Nguyen, S. T. Tran, T. N. Nguyen, H. Y. Trinh, & S. Hajkowicz. Vietnam's future digital economy – Towards 2030 and 2045. CSIRO, Brisbane, 2019.

[25] S. G. Carretero, V. Riina, and P. Yves, "DigComp 2.1: The Digital Competence Framework for Citizens with eight proficiency levels and examples of use," Publications Office of the European Union, Luxembourg, 2017.

[26] R. Vuorikari, S. Kluzer, and Y. Punie, "DigComp 2.2: The Digital Competence Framework for Citizens-With new examples of knowledge, skills and attitudes," Publications Office of the European Union, Luxembourgh, 2022.

[27] F. Khan and E. Vuopala, "Digital competence assessment across generations: A Finnish sample using the digcomp framework," International Journal of Digital Literacy and Digital Competence (IJDLDC), vol. 10, no. 2, pp. 15-28, 2019.

[28] E-Government Development Index [Data set], in United Nations E-Government Development Database, United Nations, Department of Economic and Social Affairs, Division for Public Institutions and Digital Government, 2022. [Online]. Available: https://publicadministration.un.org/egovkb/en-us/Data-Center

[29] "Promoting digital innovation to deliver value to Korean citizens," OECD, 2021. [Online]. Available: https://www.oecd.org/country/korea/digital-government

[30] D. J. Hwang, H.K. Yang, and H. Kim, E-Learning in the Republic of Korea. UNESCO Institute for Information Technologies in Education, 2010.

[31] "How the Republic of Korea became a world ICT leader?" ITU, 29 May 2020. [Online]. Available: https://www.itu.int/hub/2020/05/how-the-republic-of-korea-became-a-world-ict-leader/

[32] B. C. Buchholz, "Lessons on digital equity: How the Singapore Government has been tackling the digital divide," Centre for Public Impact (CPI), 2022. [Online]. Available: https://www.centreforpublicimpact.org/insights/lessons-on-digital-equity-how-thesingapore-government-has-been-tackling-the-digital-divide

[33] H. Aru-Chabilan, "Tiger Leap for digital turn in the Estonian education," Educational Media International, vol. 57, no. 1, pp. 61-72, 2020, doi: 10.1080/09523987.2020.1744858.

[34] "How it all began? From Tiger Leap to digital society." Education Estonia, 2021. [Online]. Available: https://www.educationestonia.org/tiger-leap/

[35] "Finland: Digital and Population Data Services Agency Sets the Direction for Digitalisation and Serves People in Various Phases of Their Lives." London: SyndiGate Media Inc, 2018. Print.

[36] "Digital Skills Report 2022. Digitally brave is confident about the future," Digital and Population Data Service Agency of Finland, 2022. [Online]. Available: https://dvv.fi/documents/16079645/141915645/Digitaitoraportti_2022_ENG.pdf/904dc52b-c50a-0ec3-d5fd-1fa7ce336055/Digitaitoraportti_2022_ENG.pdf

[37] "Finnish people are keeping up with digital development, but we must have digital support," Digital and Population Data Services Agency of Finland, 12 Feb 2022. [Online]. Available: https://dvv.fi/en/-/finnish-people-are-keeping-up-with-digital-development-but-we-must-have-digital-support

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