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Enhancing Digital Competitiveness Through the Lens of Digital Government Among Asian Economies

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ABSTRACT

This paper aims to thoroughly investigate the role of the digital government, digital competitiveness, and future readiness. A significant amount of research and literature reveals the benefits of digitizing governments as well as digital economy on development. This paper aims to measure digital economy by several digital competitiveness indicators, reflecting on the conceptual framework. The main focus is on the extent to which the implementation of the digital variables, in the context of digital competitiveness across countries, promotes the development of a digital future readiness. The sample of this study included the panel data of 12 countries in the Asia Pacific region from the World Digital Competitiveness Ranking Reports. Fixed-effect multiple regression analysis was used to explain variations in a dependent variable impacted by two or more independent factors. The results clarify that technology plays a crucial role in determining future readiness implying more policy focus in this matter.

KEYWORDS

Digital Competitiveness, Digital Economy, Digital Government, Future Readiness

INTRODUCTION

As the world economy and society todays are undergoing a transition to the so-called "fourth industrialization" era, large numbers of new technologies have emerged rapidly and continuously, such as the Internet of Things (IoT), 3D printing technology, and artificial intelligence (AI), which were mostly initializing by the complexity of digital platforms and digital ecosystems. These major changes were derived from both macro and micro-level concepts that are likely to impact the form of trade, financial, employment, and social issues, as well as the regulatory system as a whole.

In term of the private sector, digital platforms drive business growth by helping to reduce various operational costs and benefiting from online networking and the digital ecosystem (Jacobides et al. 2019). This trend, therefore, has led to changes in business models of organizations in many industries, including finance, healthcare, trading and marketing, as well as the media. Although most changes and growth of digital technology follow an organization's goal of establishment, process, and development, they directly affect the overall economic and social structure.

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However, it is not every country across the world being ready to absorb benefits presented by the growing digital economy, numbers of developing country reported facing challenges and limitations in making their ways to participate in the digital environments. The governments also have been making efforts to cope with such challenges, especially by encouraging the application of digital technologies in the public sector, to promote the digital government, which expected to help leverage the quality of public services delivery in order to meet the population's expectations ever more effectively. It is also expected that the digital government would play an important role in the country's transition to a digital economy and society.

While several factors are considered to be the key to digital economy success as Bukht and Heeks (2017) claimed, the development of digital economy is dependent on a country's ICT infrastructure as well as the ability of consumers, industries, and government departments to use digital technologies for their benefit, the focus of this paper will place on factors in relation with the digital government development. Therefore, the framework was particularly designed to test the correlations between independent and dependent variables contributing to a country's digital economy readiness index. An ultimate assumption being the development of digital government will result in a better place in digital competitiveness ranking.

This study can make significant contributions by uncovering the relationship between these domains, identifying factors influencing digital readiness assessing the impact of digital variables on readiness, uncovering challenges to digital transformation, and providing policy recommendations. By generating new knowledge in these areas, the research study can inform policymakers and practitioners about the interplay between digital government and the economy, guide strategies to enhance digital competitiveness, and offer insights into addressing barriers and fostering successful digital transformation.

LITERATURE REVIEW

The term "digital economy" was originally coined in 1996 by Don Tapscott to describe the link between a new economy, a new business model, and new technology. However, the extent of the digital economy may be regarded from a variety of perspectives, including people's daily living, making transactions, inventing innovation, and setting social standards. This is in line with the study of Mesenbourg (2001), from the United States Census Bureau, who divided the digital economy into three components, namely:

1. **e-Business Structure:** The key economic infrastructure driving the transactions of e-Business and e-Commerce.
2. **e-Business:** The business model that allows organizations to conduct activities over a computer network.
3. **e-Commerce:** The value of goods and services obtained through computer network sales. These concepts are in direct relation to the socio-economic structure driven by the computer technology (Alaerds and Grove 2017).

A comprehensive literature review discovered that information and communication technology (ICT) can help public agencies improve their working processes and overall efficiency, enhance citizens' access to public services and information, as well as increase public sector accountability on the population (Pacific Council on International Policy, 2002). In other words, using ICT such as the internet in public communication is an ultimate tool for a transition to a good government (OECD, 2013). According to Sagarik et al. (2018), "Digital Government" refers to the application of digital technology as a tool for government and public services management by strengthening the administration and integration of government information and activity to be consistent and linked

with security and good governance. The digital government aims at increasing efficiency of the public sector, facilitating the provision of public services and public data disclosure under the open government concept, and increasing public involvement from all sectors. As a result, the digital economy is highly essential for development, especially in emerging economies such as Thailand, since it is likely to help drive necessary integrations between public agencies as to increase public services delivery efficiency. The expected results of digital integration are therefore in line with Thailand's digital-economy visions including driving the connected government for smarter work and better life; strengthening the country's digital competitiveness; increasing value-adds for the overall economy; and encouraging learning, which may improve the quality of life for both population and labor.

The purpose of digital integration as outlined above is in line with the study of Liva et al. (2020), which distinguished the effects of digital government transformation into three general groups, namely: 1) efficiency and productivity gains and cost-savings; 2) effectiveness and quality improvements; and 3) transparency, accountability, trust, and legitimacy.

In terms of efficiency and productivity gains and cost savings, the study mentioned above explained that applications of information and communication technology allow the government agencies to improve public resources allocation to be more efficient, which in turn helps to reduce overall operational and labor costs in public administrations. Moreover, ICTs also help to reduce workloads for the public sector staff, especially those completely low-value-added tasks such as filing forms and documents management, allowing the staff to focus on more important tasks, such as making the service delivery faster and more convenient to the people. Therefore, the automation and digitization of government processes do not always result in job losses, as they can potentially lead to a reconfiguration of work and employment patterns, not only in the public sector but also in other industries that are implementing digital technology into their routine tasks. However, many government agencies (and private organizations) may experience challenges regarding employees' lack of digital skills, making it difficult to deploy them into other tasks, so layoffs appear to be an unavoidable decision for employers. As a result, the public sector should consider offering re-training programs to equip their employees with digital skills or other necessary skills to participate in the digital government transformation process. This solution is believed to reduce the risk of job loss and could potentially support the government in embracing the full adoption of digital technology into the public sector working processes.

Beyond faster and cheaper public services, the second group of the effects of digital government transformation focuses on effectiveness and quality improvements. According to Liva et al. (2020), much of the empirical evidence demonstrates that digital innovations are a key driver to improving the quality of public sector operations, functions, and services offered to the citizens. This is because digital transformation comes with tools that enable the government agencies to operate, for example, more precise predictions, real-time detection and tracking, efficient resources allocation, better decision-making, personalized and context-smart services, and more inclusive and empowering services and policies. These tools, as a result, will greatly support the government departments in improving the quality of services and user (citizen) satisfaction, and solve problems that are concerns to different groups of people effectively. In addition, OECD (2017) argued strongly that the digitization is a crucial ingredient in government's effort to improve citizens access to public services. An obvious example of improved government function as a result of digital government transformation is "a policy simulation model" built with artificial intelligence and big data analytics that allows the policymakers to test their policy options and unexpected consequences prior to the implementations. Some interesting examples of the policy simulation models are the UK housing market simulation model that was developed by the Bank of England in order to assess the effects of its financial-related policy measures aimed at reducing the country's financial risk and the agent computing model of the Mexican government that was designed to identify policy options necessary for achieving the United Nations Sustainable Development Goals.

Finally, digital transformation supports government agencies in strengthening transparency, accountability, trust, and legitimacy. Although some researchers believe using digital technologies in government can lead to several negative side effects, like more surveillance cameras increasing the lack of privacy, an improved public administration significantly leads to better government outputs, which benefits the citizens in many other ways. As a result, the positive effects appear to outweigh the negative ones. Nevertheless, public agencies seem to reap the most benefits from digital government transformation, particularly when technologies can support them in regaining the status of transparency and trust from the citizens. In fact, Liva et al. (2020) suggested that implementations of digital technologies in public agencies can enhance transparency and trust, mostly by enabling more open public data and better everyday interactions between citizens and the public administration. In addition, digital technology is likely to increase citizen participation in policy-making and democratic processes because the government will have faster and better channels for receiving the public opinions.

The adoption of digital technology in economic development policies strives to improve overall efficiency and create added value to overall economy in terms of gross domestic product (GDP) growth rate. In other words, digital technology will be used as a fundamental approach to modernize and systemize the government administration, allowing the delivery of inclusive and high-quality public services for the population, as well as support entrepreneurs in the private sector in developing higher-quality products and services and strengthen their ability to compete in the global market. Hence, it is vital to improve and develop a system for overseeing all aspects of government administration.

As digital economy has influence in all aspects of the society, either in the daily living of people or the economic environment, as well as becoming an applicable skillset for those seeking employment and in political decision-making. The digital economy is also propelling society toward a plethora of new development opportunities, such as increased employment, improved quality of life, and the promotion of social equality. As a policymaker in charge of economic and social development, the government must recognize the significance of the digital economy and promote the adoption of digital technology in public and private sectors in order to boost overall productivity and strengthen the country's ability to compete in this fast-changing global environment. A decent example of public's efforts to implementing digital technologies and promote digital economy is the Thai government. According to the Ministry of Digital Economy and Society (2016), the Thai government announced a master plan for digital economy development that focused on long-term and sustainable development. The 20-year National Strategy (2018–2037) establishes the operational principles and a management strategy for public services improvement through digital technology in order to promote efficiency, security, and good governance in providing services for the population. Furthermore, the strategy aims to broaden social prospects by ensuring all people have equal access to information and media through digital technology, which will greatly support improvements in the quality of life of the population.

In addition to the digital economy development strategy, the ultimate goals of digital government development should be to leverage core indicators related to digital government development; promote the growth of public services in order to satisfy people's diverse expectations accurately and conveniently without the usage of repeated documentation; provide people with accurate and convenient access to public information, in order to regain people's confidence and trust in the government, backed up by transparent implementation as well as the successful participation of people in society; strengthen the digital infrastructure of the public sector; develop an effective database management based on the integration of non-redundant data; ensure the seamless connection of day-to-day operations conducted by various government agencies; and provide people with the most efficient and reliable public services.

In 2018, the United Nations Department of Economic and Social Affairs (UNDESA) published a report on the e-Government Development Index (EGDI), which showcases an evaluation of the effectiveness of ICT adoption in government functions to provide various basic services for the citizens. The EDGI index measure the degree of digital government development at an international level by focusing on six areas of public services, including education, public health, labor and employment,

finance, social welfare, and the environment. The result report of EDGI index is therefore, regarded as a benchmark to assess the progress of e-services development in the public sector. In details, the EDGI index consists of four sub-indices that assess the efficacy of information technology adoption in the public services delivery, including: 1) Online Service Index (OSI), 2) Telecommunication Infrastructure Index (TII), 3) Human Capital Index (HCI), and 4) e-Participation Index (EPI).

As the matter of fact, there are several indicators assessing a country in terms of general socio-economic development, for example, the World Competitiveness Scoreboard, the Corruption Perception Index (CPI), as well as the United Nations 2030 Agenda for Sustainable Development, which is currently seen as a mainstream development concept. Therefore, for the sake of measuring and evaluating the digital economy development, the International Institute of Management Development (IMD), together with the IMD World Competitiveness Center, established the World Digital Competitiveness Ranking (WDCR), or the Digital IMD World, to report an evaluation on digital development.

The digital competitiveness rating considers a country's preparation in regards to three main factors: knowledge, technology, and future readiness (Digital Government Development Agency, 2016). Other important indicators that focus on measuring degrees of digital government development are, for example, the World Bank's Ease of Doing Business Index, and the European Union's Digital Economy and Society Index (DESI). A study by Marcovecchio et al. (2019) confirms that these efforts in measuring e-Government and digital government can support the monitoring and reporting of the 2030 Agenda for Sustainable Development. Therefore, it is also reasonable to assume that applications of digital technologies, particularly in public administration, can greatly assist the countries in achieving the Sustainable Development Goals (SDGs).

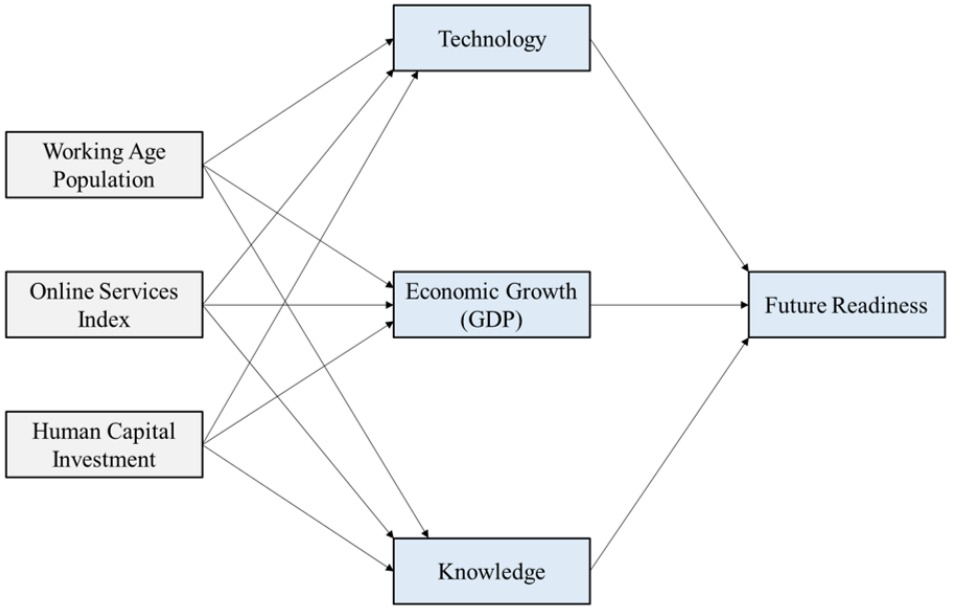
Despite a large number of studies devoted to investigate key factors contributing for an ever more advanced digital economy, yet the role of the digital government in digital economy development is least understood. Hussein et al. (2007) investigated the relationship between organizational factors and information systems success in Malaysia's e-government agencies and concluded that the identified factors, including; top management support, decision-making structure, management style, managerial IT knowledge, goal alignment, and resources allocation, are significantly drive to successful information systems adoption in public sector. Whereas, another early study set out to investigate a more multidimensional factors including; economic, social, political, demographic, cultural, and ICT infrastructure, and discovered a positive reciprocal relationship between e-government and the digital economy (Zhao et al. 2015). Obviously, there is still a lack of empirical studies that measure an influence of digital economy on the development of digital economy particularly in terms of digital competitiveness ranking. Therefore, this study aims at understanding the impact of the digital government on the development of the digital economy considering country's digital competitiveness. Key research questions being how the implementation of the digital government supports emerging economies in advancing their digital economy, and what the public-relevant factors are that effectively assist the country in improving its digital economy as a whole.

As illustrated in figure 1, the conceptual framework used in this analysis to help analyze what factors or mechanisms in public administration affect digital economy development. Variables consist of independent variables in three aspects namely working-age population, online services index, and human capital investment. Economic growth, technology and digital competitiveness ranking served as dependent variables. In addition, future readiness is the ultimate dependent variable. The conceptual framework is used as a guideline to specify the scope of the research.

RESEARCH METHODOLOGY

The study applied an integrated quantitative research method by collecting and processing secondary data with a statistical computer program to examine the degree of relationship among collected data. The secondary sources of data for this study were the World Digital Competitiveness Ranking

Figure 1. Conceptual framework
Source: Author's elaboration



Reports published biannually by the IMD World Competitiveness Center in 2018, 2016, and 2014. The IMD evaluated and ranked 63 countries across the world, divided into different continents such as Central Europe, East Africa, Asia Pacific, and the Americas (Schwab, 2019). The samples of this study included only 12 countries in the Asia Pacific region, namely Thailand, Singapore, Indonesia, Malaysia, the Philippines, Japan, South Korea, China, Mongolia, India, Australia, and New Zealand. The selection of sample countries are based on those Asian countries as it is the objective of this study to examine only the case of Asian countries.

Several analysis techniques were used, such as defining the model specification, examining the degree of correlation between independent and dependent variables with the Pearson correlation coefficient to determine the value of R^2, and processing panel data using data from 2014, 2016, and 2018 to test the hypothesis of economic outlook projection based on economic and econometric theory. Finally, a forecasting approach based on fixed-effect multiple regression analysis was used to explain variations in a dependent variable impacted by two or more independent factors.

This study employs a path analysis, using panel data regression, in order to examine relationships between dependent and independent variables. The path analysis assumes that observed variables (i.e., working-age population, online services index, and human capital investment) are directly affect the economic growth (GDP) as well as the digital competitiveness ranking in terms of knowledge and technology factor. Meanwhile, future readiness shows indirect relationship to dependent variables as it will be an outcome of improved economic growth, knowledge, and technology. Therefore, this study assumes that the dependent variables are the public-relevant factors contributing to the development of country's digital economy, and assist in improving an overall digital competitiveness ranking except for future readiness factor. Nonetheless, it should be noted here that this technique has limitations including assumptions of linearity and normality, inability to establish causality, reliance on observed variables, and potential model misspecification.

RESULTS

This study employs panel data regression, therefore it is important to discuss bivariate relationships between variables in terms of correlation.. As shown in Table 1, future readiness and technology have high correlation with each other (r = 0.9127), while economic growth (GDP) is fairly correlated with technology (r = 0.3657) and future readiness (r = 0.3022). Working-age population is also considerably correlated with future readiness and technology with the r value equal to 0.2998, and 0.1699, respectively, and correlated with the human capital investment as well (r = 0.0229).

While economic growth shows non correlation with three variables including working-age population; online services index; and human capital investment. In addition to economic growth, online services index is also not considerably correlated with future readiness and technology. Finally, human capital investment does not have positive relationship with technology and future readiness.

Table 1 illustrates results using the Pearson Correlation Coefficient to assess the degrees of correlation between studied variables. Based on linear correlation theory, there are 12 pairs of variables correlated in the same direction (positive): (OSI, HDI), (TII, HDI), (TII, OSI), (HCI, WAP), (HCI, HDI), (HCI, OSI), (HCI, TII), (Technology, GDP), (Technology, WAP), (Future readiness, GDP), (Future readiness, WAP), and (Future readiness, Technology).

On the other hand, there are 16 pairs of variables correlated in the opposite direction (negative): (WAP, GDP), (HDI, GDP), (HDI, WAP), (OSI, GDP), (OSI, WAP), (TII, GDP), (TII, WAP), (HCI, GDP), (Technology, HDI), (Technology, OSI), (Technology, TII), (Technology, HCI), (Future readiness, HDI), (Future readiness, OSI), (Future readiness, TII), and (Future readiness, HCI). The values of coefficient ® of both correlations were quite high, at close to 1. To summarize, economic growth (GDP), working-age population (WAP), online services (OSI), human capital investment (HCI), technology, and future readiness are correlated with the World Digital Competitiveness Ranking at the statistical significance level of P = 0.05.

The next step of research method used in this study, which is the main technique, is the panel data regression with fixed effect. Table 2, therefore, displays the coefficient estimates of panel data regression analysis. Future readiness as a dependent variable in our conceptual framework is significantly and directly influenced by technology variable with the coefficient of 0.677. This reflects that future readiness cannot be changed by economic growth (GDP) and knowledge. Therefore, improved technology can lead to higher future readiness digital competitiveness ranking.

Moving onto knowledge as a dependent variable, there are two independent variables that can significantly influence knowledge which are working-age population (WAP) and online services index

Table 1. Pairwise correlation

Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
[1] GDP	1.000							
[2] WAP	-0.090	1.000						
[3] HDI	-0.615	-0.111	1.000					
[4] OSI	-0.279	- 0.073	0.726	1.000				
[5] TII	-0.605	-0.144	0.950	0.757	1.000			
[6] HCI	-0.598	0.022	0.889	0.586	0.844	1.000		
[7] Technology	0.365	0.299	-0.860	- 0.645	-0.814	- 0.640	1.000	
[8] Future readiness	0.302	0.169	-0.847	- 0.738	-0.793	- 0.647	0.912	1.000

* Number of obs = 36
Source: Author's computation

Table 2. Coefficient estimates of digital competitiveness ranking in forecasting equations

	Future Readiness			Knowledge			GDP			Technology		
	Coefficient	Std. Err	P-value	Coefficient	Std. Err	P-value	Coefficient	Std. Err	P-value	Coefficient	Std. Err	P-value
Knowledge	0.170	0.116	0.142									
GDP	0.167	0.498	0.737									
Technology	0.677*	0.114	0.000									
WAP				0.576*	0.178	**0.001**	-0.017	0.030	0.562	0.593*	0.201	**0.003**
OSI				-58.478*	10.494	**0.000**	0.525	1.789	0.769	-37.331*	11.853	**0.002**
HCI				-25.739	15.640	**0.100**	-10.814*	2.688	0.000	-63.950*	17.664	**0.000**
Year control	3			3			3			3		
N	Number of Obs. 36			Number of Obs. 36			Number of Obs. 36			Number of Obs. 36		

Source: Author's computation

(OSI). The P-value between these variables to knowledge are 0.001 and 0.000, respectively. This is in line with the conceptual framework as the path analysis, except the insignificant impact of human capital investment (HCI), which indicated a direct relationship between working-age population and knowledge as well as online services index and knowledge.

Economic growth (GDP), which is dependent variable, is significantly influenced by human capital investment (HCI) independent variable as the P-value equals to 0.000. This is in accordance with the path analysis which shows direct relationship between HCI to GDP, as well as WAP to GDP, and OSI to GDP. However, the P-value of independent variable WAP and OSI to GDP dependent variable equal to 0.562, and 0.769, respectively. Therefore, only human capital investment (HCI) independent variable can affect economic growth digital competitiveness ranking at a statistical significance level.

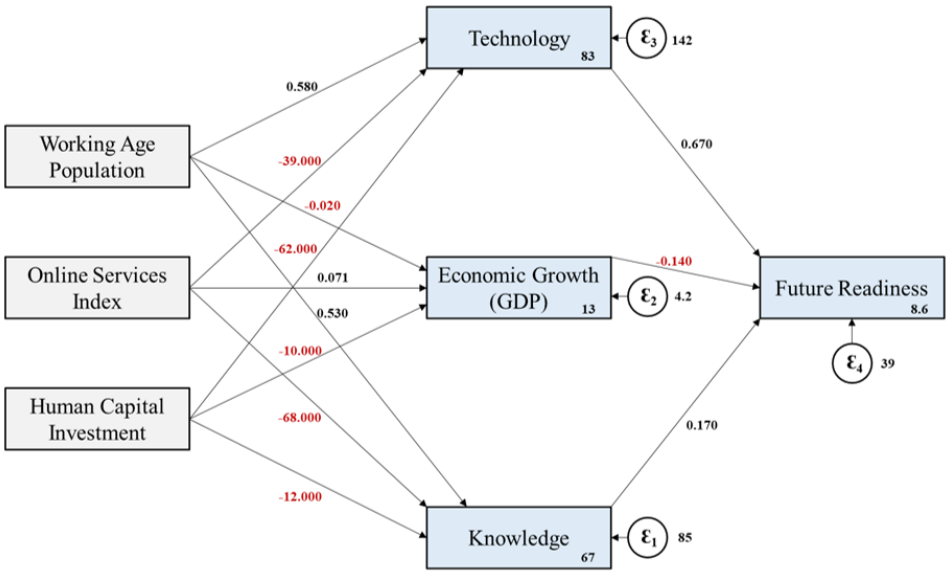
Finally, technology as a dependent variable are significantly influenced by all independent variables that show direct relationship with technology in the path analysis, including, working-age population (WAP), online services index (OSI), and human capital investment (HCI). The P-value of each variable to technology is equaled to 0.003, 0.002, and 0.000, respectively.

DISCUSSION

By using a multiple regression technique to estimate the results of path analysis, this study found that independent and dependent variables used to test equation correlation in forecasting the influence of digital government on digital economy development is correlated in both directions. The degree of correlation is considerable high if the coefficient value stood close to 1 point and showed the value of probability used in correlation hypothesis testing at a statistical significance level of $P = 0.05$. As discussed above, there are four independent variables that can significantly affect dependent variables (P-value is lower than 0.05) namely technology, working-age population (WAP), online services index (OSI), and human capital investment (HCI). Hence, this is in line with the conceptual framework designed by using the technique of path analysis.

Figure 2 below reports the results of path analysis which as illustrated earlier in the conceptual framework of this study. Numbers on the path show degrees of coefficient between the two variables, either positive or negative, and star mark implies that the impact is significant. However, negative relationship does not necessarily mean the independent variables do not influence the dependent ones, in fact, they affect dependent variables in terms of ranking movement. Considering four independent variables that affect the digital competitiveness ranking significantly, working-age population has positive relationship to technology and knowledge while binding to economic growth with a negative number. Such finding suggests that a one-percent-point increase in the

Figure 2. Results of path analysis
Source: Author's computation



working-age population will boost the advancement of technology and knowledge by 0.580, and 0.530, respectively. Meanwhile, as the working-age population grows, the digital competitiveness ranking in terms of GDP will also improve.

As listed on the path analysis, online services index (OSI) is another independent variable with forecasting capability, possesses a positive correlation coefficient with the economic growth (GDP) dependent variable, yet a negative coefficient with technology and knowledge dependent variable. This is in accordance to the results of coefficient estimates illustrated in Table 3, suggesting that online services index can influence technology and knowledge at a highly significant level. Therefore, according to the results shown on path analysis, it is to be perceived that increasing in online service index (by one-percent-point) will lead to a better rank in terms of technology and knowledge. In details, technology will improve by 39 ranks and knowledge will improve by 68 ranks. Meanwhile, increase in online services index will improve GDP by 0.071 percent.

Human capital investment (HCI), on the other hands, reveals a negative relationship to all three dependent variables listed on the conceptual framework. This fact refers to an ability of HCI to influence dependent variables in terms of digital competitiveness ranking movement. In addition, coefficient estimates show that human capital investment can significantly affect economic growth and technology as the P-value between HCI and these two dependent variables is below 0.05. Therefore, according to the path analysis, a 1-percent rise in human capital investment will improve the rank of GDP and technology as in digital competitiveness ranking by 10 places, and 62 places, respectively. In addition, increase in human capital investment will also improve the rank of knowledge by 12 positions.

Last but not least, considering technology as an independent variable, coefficient estimates suggest that technology can affect future readiness dependent variable at a highly significant level as the P-value was lower than 0.05. This is in line with the result of path analysis which shows that a 1-percent increase in technology will boost the development of future readiness ranking by 0.67 percent. In order to adopt digital technology as a new economic driver, it is critical for the government to evaluate the effects on every aspect of society due to the digital technology implementation, for example, structural adjustments of the organizations, development of human capital with expertise in

digital technology, and cyber security, as well as issues related to unemployment. Moreover, the study discovered a number of challenges hindering public sector from becoming a fully digital government, including a lack of leadership with decent vision and problem-solving skills; most organizations applying a highly hierarchical structure and following too many rules and regulations; a lack of regulatory frameworks that fully support the implementation of new technologies; a lack of effective organization performance monitoring and evaluation system; issues regarding digital divides; and issues regarding overall attitude towards the importance of digital technology.

CONCLUSION AND POLICY RECOMMENDATIONS

This article underscores the importance of open government practices and cybersecurity in the digital era. It emphasizes the need to enhance citizens' access to public information, encourage participation in policy-making, and improve public service delivery. Furthermore, it highlights the role of modern management and instilling confidence in the digital economy. The lack of continuous government support is identified as a hindrance to entrepreneurial innovation, and the importance of digital technology application in the public sector for efficient service delivery is emphasized.

Public sector agencies should prioritize the open government concept to enhance citizens' access to public information. Encouraging citizen participation and opinions on policies and public services can significantly improve service delivery. Examples of digital channels for public comments include online forums, complaint submissions, surveys, and social media platforms. The practical implication is increased transparency and accountability, while limitations may arise from digital inclusivity challenges. Future directions involve exploring emerging technologies for broader citizen engagement.

The government plays a crucial role in raising awareness about cybersecurity issues and fostering collaboration across relevant sectors to improve cyber defenses and information systems. This supports risk management and enhances consumer and industry confidence. Limitations include the evolving nature of cyber threats and resource constraints. Future directions entail investing in advanced technologies, fostering international cooperation, and continuously updating cybersecurity policies.

Insufficient government support impedes entrepreneurial innovation in developing countries, undermining their digital competitiveness. To address this, the government should implement clear administrative guidelines and policies for each sector to support the digital industry. A long-term training program aiming to produce digitally skilled labor and an effective monitoring and evaluation mechanism are suggested. This can lead to effective human capital development and digital economy growth. Limitations include budget constraints and a lack of expertise. Future directions involve collaboration with industry stakeholders and continuous investment in digital skills development.

The application of digital technology in the public sector improves service delivery efficiency and citizen participation. It is crucial to ensure equal access to basic information services, such as the Internet and computer networking, for all sectors and populations. This fosters a robust digital ecosystem and supports digital government development. Practical implications encompass improved public administration, reduced corruption, increased transparency, and enhanced government credibility. Limitations may arise from infrastructure gaps and digital literacy challenges. Future directions involve bridging the digital divide, promoting digital literacy programs, and leveraging emerging technologies for transformative public services.

The key message delivered above are essentials. Practical implications include transparency, citizen engagement, economic development, and improved public services. Limitations stem from inclusivity challenges, resource constraints, and infrastructure gaps. Future directions entail leveraging emerging technologies, fostering collaboration, investing in digital skills, and promoting equitable access to digital services. By addressing these implications and pursuing these future directions, governments can harness the full potential of the digital era for the benefit of their populations.

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