

Does Financial Literacy Matter with National Competitiveness? The Role of Digital Capability

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Received 7 August 2023; received in revised form 17 November 2023; accepted 16 December 2023

Abstract

This paper investigates whether financial literacy contributes to national competitiveness. Furthermore, it also explores how national digital capability changes the relationship between financial literacy and national competitiveness. By using the data from the OECD/INFE 2020 International Survey of Adult Financial Literacy, the cross-sectional regression models were constructed to explore the relationships among financial literacy, national competitiveness and digital capability. Our findings indicate that higher levels of financial literacy are associated with greater national competitiveness. Additionally, digital capability amplifies the impact of financial literacy on national competitiveness. These findings highlight the importance of promoting financial literacy and digital capability for enhancing a nation's competitiveness in the global economy.

Keywords: Financial literacy, national competitiveness, digital capability

1. Introduction

Delgado, Ketels, Porter and Stern (2012) defined national competitiveness from the aspect of foundational competitiveness, which includes the macroeconomic competitiveness and the microeconomic competitiveness. According to Global Competitiveness Index (GCI)¹, national competitiveness determines the level of productivity in a country, taking into account its level of development. It signifies the capabilities of one country to attract the global investment, to increase its per capita GDP, to provide wealth and jobs for its own citizens, and eventually to boost their standard of life. In short, national competitiveness plays a vital role to a country economic system, attract investors, improve its welfare, and build wealth for its people.

In recent years, countries across the world have been facing the economic crisis due to a series of severe events, such as COVID-19, and the war between Russia and Ukraine, which led to a string of setbacks such as “food and energy crises, surging inflation, debt tightening, as well as the climate emergency.” (UNCTAD, 2023). Both developed and developing countries have been threatened by high inflation, and the current recession is slowing the pace of economic recovery. Therefore, all countries around the world must have an effective strategy for their citizen to be able to overcome the current situation. One of the capacities to resist

the crises would be the national competitiveness.

Widdowson and Hailwood (2007) suggested that financial literacy may have a considerable influence on the soundness and efficiency of financial systems. It also affects financial decision-making for those with low financial literacy are much less likely to participate in stock market (van Rooij, Lusardi & Alessie, 2011). Financial literacy has been identified as the key factor for nations to create prosperity, and attend to the world economic system (Remund, 2010). Grohmann, Klühs and Menkhoff (2018) found that financial literacy had positive impacts on financial inclusion, measured as access to and use of financial services. Financial inclusion has been an important goal of economic and financial development. It has been argued to be an important policy tool that can help to achieve the Sustainable Development Goals (SDGs) (Klapper, El-Zoghbi, & Hess, 2016). From the above discussions and evidence, the current study aims to investigate whether national financial literacy contributes to national competitiveness.

Digitalization refers to the adaptation of new technologies in companies and society as a whole (Marti & Puertas, 2023). The evolution of information and communication technology (ICT) accelerates the efficiency of financial markets. Whether the organizations or individuals can adapt to advanced ICT and implement it depends on how the governments devoted to nurture digital capabilities of their people. Ferrari (2012) found that in many countries, tech-

¹ <https://www.weforum.org/publications/?page=1>

nological development has been a priority in government agendas and considered as the engine to drive the economic and competitive development. Yunis, Koong, Liu, Kwan & Tsang (2021) suggested that ICT plays an important role in driving a country's global competitiveness forward. Innovation has become a critical strategy for business and a boost factor for countries seeking a competitive advantage, fostering economic development and increasing wealth (Marti & Puertas, 2023). Hence, the second purpose of the current study is to investigate whether the national digital capability facilitates the effects of financial literacy on the national competitiveness.

This study aims to address two important questions: How does a nation's level of financial literacy impact its competitiveness? And how does digital capability influence this relationship? Understanding the intersection of financial literacy, national competitiveness, and digital capability is vital for policymakers and stakeholders who aim to foster economic growth and prosperity in an increasingly digitalized world.

2. Literature Review

2.1 National Competitiveness

In the modern world, competitiveness is gained more and more attention from the public and is set as an ultimate goal for a country to aim for. In order to fulfill that goal, it needs the contribution of many factors, such as economic, social welfare, environmental protection and so on to have a sustainable development for a nation and their citizens. Among these factors, economic development is the most concern, and competitiveness is clearly seen as a heart of economics (Berger, 2008). As mentioned earlier, Global Competitiveness Index (GCI) defines "Competitiveness as the set of institutions, policies, and factors that determine the level of productivity of a country." Regarding this definition, Ulman (2014) stated that competitiveness is affected by the national environment. In other word, the process of doing business is closely adhered to the condition of a nation, whether it is favorable for a firm to run smoothly or not, depend on what they offered by the government, policy, and many other factors of the national environment.

Furthermore, National Competitiveness, according to Delgado et al. (2012), is a term widely used in many fields, including policy community and academic research, that refers to the potential for achievement in some outcomes such as a stand of living, economic growth, job creation, export., etc. Some indicators related to local conditions such as low wages, labor costs, and budget, etc., had also

been debated by many scholars to figure out the contribution of these elements to the economic performance of a country and the differences cross-country.

According to IMD – World Competitiveness Ranking center, the present study conducted a thorough investigation by incorporating relevant economic literature, national, international, and regional sources, and feedback obtained from industry representatives, government entities, and academic scholars, to identify a total of 333 competitiveness criteria. The criteria undergo periodic revisions and updates to accommodate the advancements in theories, research, and empirical data, while simultaneously adapting to the changing landscape of the global economy.

2.2 Financial Literacy

The term financial literacy first appeared in 1787 in the letter of John Adams to Thomas Jefferson, discussing the concern about the ignorance of Americans toward finances of all kinds. The concept, hereafter, was used repeatedly by many researchers, organizations, and governments. However, there is no well-defined for this term. Before a widely accepted definition, numerous scholars tried to describe financial literacy. Among them, some remarkable definitions were of Mandell (2007): "the ability to evaluate the new and complex financial instruments and make informed judgments in both choice of instruments and extent of use that would be in their own best long-run interests." Remund (2010) emphasizes personal competency in money management. Or a more comprehensive definition as "a combination of awareness, knowledge, skill, attitude, and behavior necessary to make sound financial decisions and ultimately achieve individual financial well-being" (INFE 2011). Later in 2014, Organization for Economic Co-operation and Development (OECD) conceptualized financial literacy as "knowledge and understanding of financial concepts and risks, and the skills, motivation, and confidence to apply such knowledge and understanding to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life." And this definition has been recognized as a well-defined statement for financial literacy.

Despite the awareness of financial literacy, not yet further researches conducted to identify how it applied back in 2006. Therefore, it called for research on financial literacy measurement (Marcolin & Abraham, 2006). According to Marcolin and Abraham (2006), this is the role of public policy to educate consumers' financial literacy to improve welfare

through better decision-making. Remund (2010) mentioned the benefit of understanding and using the knowledge of financial literacy as a fundamental to building wealth and participating in the economy to improve lives from a small scale of a family to a macro scale of a community. In OCED's definition, they mainly focused on three dimensions, namely: financial knowledge, financial behavior, and financial attitude (OECD, 2005, 2013, 2014; OECD-INFE, 2011; Atkinson & Messy, 2012) as a framework to measure financial literacy.

2.3 Digital Capability

Digitalization plays a more crucial role than ever in determining competitiveness. It is imperative for all countries to leverage digital technologies, especially in business and economics, as they serve as tools for leading the field. The IMD's World Digital Competitiveness Ranking (WDCR) defines national digital competitiveness as an economy's ability to adopt and explore digital technologies that bring about changes in corporate models, government procedures, and society at large (Developers, 2022). The ranking aims to assess the extent to which a country embraces digital technologies, leading to transformations in government practices, business models, and society in general.

The IMD World Digital Competitiveness Ranking evaluates national digital competitiveness based on three factors: knowledge, technology, and future readiness. Knowledge encompasses the essential framework that supports digital transformation through the exploration, comprehension, and education of new technologies. Technology evaluates the broader context that facilitates the advancement of digital technology, including a supportive regulatory framework that fosters corporate growth, innovation, and effective business operations while enforcing relevant regulations. Lastly, future readiness assesses an economy's preparedness for its digital revolution.

Maintaining a country's competitiveness requires a symbiotic relationship between financial literacy and digital capability. Lyons and Kass-Hanna (2021) presented a framework for digital financial literacy (DFL) that considers the unique aspects of financial services in the digital realm. They discussed the characteristics and limitations of these approaches and provided suggestions for addressing challenges in constructing, testing, and standardizing multidimensional measures, as well as methodological issues in modeling and estimation. Kumar et al. (2023) highlighted that digital financial literacy directly influences and acts as a mediator in financial decision-making. They identified financial capability and financial

autonomy as significant mediators, while noting that impulsivity does not play a mediating role in financial decision-making. Koskelainen et al. (2023) proposed guidance for evaluating digital financial literacy, revising financial education curricula, and creating digital learning tools. They emphasized the importance of collaboration between the public and private sectors to promote a fairer and more inclusive economic environment. Panos and Wilson (2020) argued that addressing challenges such as student debt, promoting digital financial inclusion, and mitigating risks of online financial fraud require policy interventions, such as financial education and informed financial advice. To contribute to the academic and policy agenda, this special issue presents seven new papers that explore various aspects of financial literacy and responsible finance from diverse literature streams. These papers aim to enhance understanding of these topics and support efforts to improve financial well-being and overall welfare.

In short, previous literature reviews have highlighted the importance of national competitiveness, financial literacy, and national digital competitiveness. However, the fundamental question of how financial literacy impacts a nation's competitiveness and the correlation among these three variables remains unanswered. Thus, the focal purpose of this paper is to investigate the relationship between these elements while also touching on national business competitiveness performance indicators.

3. Methodology

To investigate the first research question, we construct a cross-sectional regression model to test how financial literacy affects national competitiveness as Eq. (1),

$$NC_i = \beta_0 + \beta_1 FL_i + \beta_2 dGDP_i + \varepsilon_i \quad (1)$$

where, NC_i refers to the national competitiveness of country i , and we use the national competitiveness ranking, the economic factor ranking and the business factor ranking to run the regression model iteratively. FL_i is the financial literacy score of country i and we use the national financial literacy score and the three dimensions scores, knowledge, behavior and attitude to run the regression iteratively. We control for the possible impact from national economic growth, $dGDP_i$.

Also, to investigate the second research question, we conduct a cross-sectional regression model by adding an interaction term, $FL_i * Tech_i$ to Eq. (1) to test the moderating effect of national digital competitiveness on the relationship of financial literacy and national competitiveness,

$$NC_i = \beta_0 + \beta_1 FL_i + \beta_2 FL_i * Tech_i + \beta_3 dGDP_i + \varepsilon_i \tag{3}$$

where, $Tech_i$ refers to national digital competitiveness ranking and $FL_i * Tech_i$ is the interaction term of financial literacy and national digital competitiveness.

The sample countries include the participating countries and economies in OECD/INFE

2020 International Survey of Adult Financial Literacy, which cover Austria, Bulgaria, Colombia, Croatia, Czech Republic, Estonia, France, Germany, Hong Kong, Hungary, Indonesia, Italy, Korea, Malaysia, Peru, Poland, Portugal, Romania, Slovenia, and Thailand. Table 1 provides the national characteristics of the sample countries.

Table 1: Descriptive Statistics

	mean	p50	sd	min	max
Competitiveness	36.250	36.500	14.664	7.000	59.000
Economic	30.850	29.500	15.017	3.000	60.000
Business	37.950	37.000	16.443	3.000	64.000
Tech	35.000	36.000	16.190	5.000	61.000
FinLiteracy	61.350	62.050	5.362	53.000	71.100
Knowledge	63.425	64.150	9.746	48.300	88.200
Behavior	60.072	59.550	6.598	46.300	69.700
Attitudes	61.126	61.200	6.469	52.000	77.300
dGDP	-5.374	-5.519	2.828	-10.953	-0.551
N	20				

Note. Competitiveness is the national competitiveness ranking. Economic refers to economic factor of national competitiveness. Business refers to the business factor of national competitiveness. Tech refers to national digital competitiveness. FinLiteracy refers to national financial literacy scores. Knowledge, Behavior and Attitude are three dimensions of national financial literacy. dGDP refers to national economic growth rate.

4. Results

Table 2 demonstrates the correlation between variables concerned in this research. The coefficient between financial literacy and na-

tional competitiveness ranking is negative, indicating that the higher the financial literacy level, the greater competitiveness the country could have.

Table 2: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1)Competitiveness	1								
(2)Economic	0.711***	1							
(3)Business	0.922***	0.456*	1						
(4)Tech	0.881***	0.646***	0.725***	1					
(5)FinLiteracy	-0.700***	-0.464*	-0.605***	-0.703***	1				
(6)Knowledge	-0.624***	-0.433*	-0.470**	-0.731***	0.785***	1			
(7)Behavior	-0.490**	-0.259	-0.511**	-0.418*	0.754***	0.242	1		
(8)Attitudes	-0.275	-0.282	-0.241	-0.153	0.511**	0.168	0.344	1	
(9)dGDP	-0.315	-0.542**	-0.156	-0.365	0.273	0.153	0.282	0.135	1

Note. Competitiveness is the national competitiveness ranking. Economic refers to economic factor of national competitiveness. Business refers to the business factor of national competitiveness. Tech refers to national digital competitiveness ranking. FinLiteracy refers to national financial literacy scores. Knowledge, Behavior and Attitude are three dimensions of national financial literacy. dGDP refers to national economic growth rate.

Table 3 demonstrates the regression results of financial literacy on the national competitiveness. The coefficient of financial literacy from Model (1) of Panel A is significantly negative (-1.887), indicating that the higher the financial literacy score, the better the national competitiveness ranking. From Model (1) of Panel B and C, we also find that two dimensions of financial literacy, knowledge and behavior also have negative and significant regression coefficients, indicating that the better the financial knowledge and behavior, the greater the national competitiveness. However,

from Model (1) of Panel D, financial attitude has no effect on national competitiveness.

From Model (2) of the four panels, we find that financial literacy has no impact on the economic factor of national competitiveness. However, from Model (3) of Panel A, B and C, financial literacy drives the business factor of national competitiveness. In short, the results from Table 3 provide the evidence that financial literacy could enhance national competitiveness after controlling for national economic growth rate.

Table 3: Regression Results of Financial Literacy on National Competitiveness

Panel A	(1) Competitiveness	(2) Economic	(3) Business
FinLiteracy	-1.887*** (-3.52)	-0.998 (-1.65)	-1.909** (-2.84)
dGDP	-0.697 (-0.71)	-2.406** (-2.16)	0.058 (0.05)
_cons	149.228*** (4.29)	80.288* (2.04)	156.391*** (3.59)
N	18	18	18
adj. R ²	0.441	0.322	0.281
Panel B	(1) Competitiveness	(2) Economic	(3) Business
Knowledge	-0.847*** (-2.93)	-0.513 (-1.70)	-0.669* (-1.78)
dGDP	-0.987 (-0.99)	-2.414** (-2.32)	-0.395 (-0.30)
_cons	84.680*** (4.23)	50.417** (2.42)	78.274*** (3.01)
N	20	20	20
adj. R ²	0.310	0.284	0.072
Panel C	(1) Competitiveness	(2) Economic	(3) Business
Behavior	-1.008* (-1.90)	-0.274 (-0.51)	-1.295** (-2.19)
dGDP	-1.002 (-0.84)	-2.732** (-2.27)	-0.076 (-0.06)
_cons	92.438** (2.70)	33.815 (0.98)	116.401*** (3.05)
N	18	18	18
adj. R ²	0.177	0.213	0.163
Panel D	(1) Competitiveness	(2) Economic	(3) Business
Attitudes	-0.658 (-1.25)	-0.685 (-1.43)	-0.855 (-1.40)
dGDP	-1.487 (-1.24)	-2.728** (-2.50)	-0.664 (-0.48)
_cons	69.062* (2.07)	58.549* (1.93)	86.809** (2.24)
N	19	19	19
adj. R ²	0.067	0.273	0.014

Note. Competitiveness is the national competitiveness ranking. Economic refers to economic factor of national competitiveness. Business refers to the business factor of national competitiveness. Tech refers to national digital competitiveness ranking. FinLiteracy refers to national financial literacy scores. Knowledge, Behavior and Attitude are three dimensions of national financial literacy. dGDP refers to national economic growth rate.

t statistics in parentheses; * p < 0.10, ** p < 0.05, *** p < 0.01

Table 4 investigates the moderating effect from national digital competitiveness. From Model (1) of Panel A, the coefficient of interaction term, $FL_i * Tech_i$ is significantly positive, indicating that national digital competitiveness could strengthen the relationship between financial literacy and national competitiveness. Greater digital competitiveness increases the impacts of financial literacy on national competitiveness. Furthermore, the coefficients of the interaction term between knowledge and digital competitiveness from Model (1) of Panel B,

that between behavior and digital competitiveness from Model (1) of Panel C and that between attitude and digital competitiveness from Model (1) of Panel D are all significantly positive, indicating that digital competitiveness could increase the impacts of financial knowledge, behavior and attitude on national competitiveness. In short, the results from Table 4 provide the evidence that national digital competitiveness can enhance the driving impacts of financial literacy on national competitiveness.

Table 4: Moderating Effect from National Digital Competitiveness

	(1)	(2)	(3)
Panel A	Competitiveness	Economic	Business
FinLiteracy	-0.841*	-0.337	-0.942
	(-1.95)	(-0.49)	(-1.37)
FinLiteracy_X_Tech	0.011***	0.007	0.010**
	(4.39)	(1.76)	(2.54)
dGDP	-0.082	-2.017*	0.627
	(-0.12)	(-1.89)	(0.58)
_cons	64.908**	26.987	78.454
	(2.15)	(0.57)	(1.62)
<i>N</i>	18	18	18
adj. <i>R</i> ²	0.748	0.405	0.473
Panel B	Competitiveness	Economic	Business
Knowledge	-0.166	-0.191	0.116
	(-0.78)	(-0.54)	(0.35)
Knowledge_X_Tech	0.014***	0.007	0.016***
	(5.62)	(1.59)	(4.17)
dGDP	0.100	-1.901*	0.857
	(0.16)	(-1.81)	(0.88)
_cons	17.434	18.651	0.819
	(1.03)	(0.66)	(0.03)
<i>N</i>	20	20	20
adj. <i>R</i> ²	0.753	0.343	0.527
Panel C	Competitiveness	Economic	Business
Behavior	-0.847**	-0.164	-1.153**
	(-2.86)	(-0.36)	(-2.52)
Behavior_X_Tech	0.012***	0.008**	0.011***
	(5.87)	(2.61)	(3.36)
dGDP	-0.039	-2.075*	0.775
	(-0.06)	(-1.97)	(0.73)
_cons	62.959***	13.705	90.350**
	(3.19)	(0.45)	(2.97)
<i>N</i>	18	18	18
adj. <i>R</i> ²	0.745	0.433	0.504
Panel D	Competitiveness	Economic	Business
Attitudes	-1.034***	-0.901*	-1.208**
	(-3.57)	(-2.12)	(-2.60)
Attitudes_X_Tech	0.013***	0.007**	0.012***
	(6.37)	(2.49)	(3.73)
dGDP	0.073	-1.831*	0.806
	(0.11)	(-1.81)	(0.73)
_cons	72.483***	60.517**	90.031***
	(4.04)	(2.29)	(3.13)
<i>N</i>	19	19	19
adj. <i>R</i> ²	0.731	0.451	0.455

Note. Competitiveness is the national competitiveness ranking. Economic refers to economic factor of national competitiveness. Business refers to the business factor of national competitiveness. Tech refers to national digital competitiveness ranking. FinLiteracy refers to national financial literacy scores. Knowledge, Behavior and Attitude are three dimensions of national financial literacy. dGDP refers to national economic growth rate.

t statistics in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5. Conclusion

The study utilized a quantitative approach, combining data on National Competitiveness, Financial Literacy, and National Digital Competitiveness. Through cross-sectional regression analysis, the study aimed to address two research questions:

What is the influence of financial literacy on national competitiveness?

How does digital competitiveness moderate the impact of financial literacy on national competitiveness?

Regarding the first question, the study found a significant positive relationship between financial literacy and national competi-

tiveness. Countries with higher financial literacy exhibited greater competitiveness.

For the second question, digital competitiveness was identified as a facilitator in the business process, enhancing the impact of financial literacy on national competitiveness.

However, the study has limitations. It primarily focused on quantitative analysis, potentially overlooking qualitative aspects that could provide a deeper understanding of the connections between financial literacy, digital competitiveness, and national competitiveness. Future research should consider incorporating qualitative methods, such as interviews or case studies, to gain richer insights into individuals' and organizations' experiences.

Additionally, the study only considered national competitiveness as the outcome variable, neglecting the multidimensional nature influenced by factors beyond financial literacy and digital competitiveness. Future studies should include other relevant variables like innovation, infrastructure, or institutional factors to obtain a comprehensive understanding.

To address these limitations, future research should adopt a mixed-methods approach, conduct longitudinal studies, and explore the role of cultural and contextual factors in shaping the relationships between financial literacy, digital competitiveness, and national competitiveness.

In conclusion, this study underscores the significant impact of financial literacy on national competitiveness and emphasizes the need to leverage digital technologies in business operations to enhance a nation's competitiveness.

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