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GLOBAL BUSINESS & FINANCE REVIEW

Development of Financial Technology in Realizing a Smart City through Education and Awareness

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ABSTRACT

Purpose: *This paper examines the ethical implications of the use of ChatGPT in academia*

Design/methodology/approach: *A comprehensive questionnaire was used to gather 320 responses from Jakarta students who were knowledgeable about and concerned with smart cities. Model testing is done in this quantitative study using the research hypothesis design as a guide. Stata 17, a statistical program, was used to process and analyze the questionnaire data using the Structural Equation Model (SEM).*

Findings: *The research results show that the use of financial technology has a positive relationship in supporting student education and awareness. Furthermore, it was stated that there is a direct positive relationship between the use of financial technology and smart city development. Another finding stated that there was a positive and supportive relationship between student education and awareness of smart city development. The development of smart cities can be facilitated by the use of financial technology through education and increased awareness. Studies on the behavior of financial technology users are supporting the development of smart cities, a concept that is still evolving.*

Research limitations/implications: *The results of this study can't be applied to larger metropolitan populations because it only examines Jakarta's student population. For a more comprehensive smart city model, future studies should incorporate a range of factors, including urban planning and the green economy.*

Originality/value: *This study evaluates the combined effects of financial technology, education, and awareness on the development of smart cities in a novel way. SEM-Stata analysis is used to provide empirical data in the context of a growing economy, such as Indonesia.*

Keywords: Development, Education and Awareness, Financial Technology, Smart City.

I.   Introduction

The concept of a smart city is the culmination of several emerging concepts and technologies. (Popova & Popovs, 2022). The smart city concept emerged in the late 1980s and early 1990s, focusing on utilizing technology to enhance efficiency and quality of life in large cities. In the United States, the smart growth and new urbanism movements emerged to address the problem of unplanned urbanization and plan more sustainable city development. (Batty, 2015). In the 2010s, the smart city concept continued to evolve,

becoming more holistic and integrated, with an emphasis on community participation, quality of life, and long-term planning. (Hajduk, 2021). Blockchain technology, artificial intelligence (AI), and 5G are increasingly popular. (Dameri, 2017; Yin et al., 2015). Digital technology and smart cities played a significant role during the COVID-19 pandemic, as evidenced by the surge in teleworking, the adoption of health apps, and the development of data-driven solutions to address social and health issues.(Yuen et al., 2020). Social innovation and the active involvement of citizens in city planning are becoming more critical, as is the use of digital platforms for participation and feedback. (Atsushi Deguchi, 2020). The smart city is a city development concept that applies and integrates technology innovatively, efficiently, and effectively by connecting physical, economic, and social infrastructure in society to improve living standards and increase productivity. (Krupkin & Gorodnova, 2018).

One of the most important aspects of a smart city is the use of information and communication technology for data collection, analysis, and management. (Matos et al., 2017). With connected sensors and devices in every city, the information obtained can be used to make better decisions and provide more effective services to the general public. (Krupkin & Gorodnova, 2018). For example, traffic data can be used to minimize congestion and optimize the timing of traffic lights. Information about energy consumption can be used to identify inefficient users and limit overall energy consumption. (Cook & Schmitter-Edgecombe, 2009; Yin et al., 2015). Smart cities have developed in cities such as Singapore, Seoul, Songdo, Barcelona, and South Korea, and this model is also feasible in other cities worldwide. (Qian et al., 2021). The smart city concept will continue to

evolve, driven by technological advancements, shifting urban needs, and efforts to create more innovative, efficient, and sustainable urban environments. (Silva et al., 2018).

One indicator of a smart city is a smart economy. (Pratama, 2014). Economic development in a region must be carried out more carefully and with attention to detail. The implementation and development of smart cities in a smart economy encompass two key aspects: the innovation process and competitive advantage. (Tosida et al., 2022). These two factors are conducive to achieving a more prosperous and stable national economy, as innovation and competitiveness are the primary means of driving national growth and accelerating resource development. Increasing access, equity, and relevance, improving basic social services, enhancing the quality and competitiveness of the workforce, controlling population growth, and promoting community participation are key directions for resource development in a region. (Galperina et al., 2016; Krupkin & Gorodnova, 2018). Development in a smart city always involves capital, including social capital, economic capital, and human capital. Smart people can be described as the primary goal that must be met to develop a smart city. (Indrawati et al., 2018). Meanwhile, smart governance is a component or aspect of a smart city that focuses on the government policy framework. (Popova & Popovs, 2022). Collaboration between the government and society is expected to improve the quality and quantity of public services as well as the government's ability to uphold justice, fairness, integrity, and democracy. (Pereira et al., 2018; Tomor et al., 2019).

One aspect of a smart city that focuses on mass transportation and citizen mobility is smart mobility (Matos et al., 2017). In this context there is a process of intelligent mobility and transportation, therefore it

is hoped that public transportation and mobility services will be developed to improve the overall quality of transportation and minimize common problems related to transportation, such as pollution, late arrivals, traffic jams, and so on (Gyula, 2022; Šurdonja et al., 2020). Apart from that, attention must be paid to the smart environment, as it is closely related to the smart city aspect, which focuses on creating a resilient environment. These assessment criteria highlight the importance of a more thorough and slower day-to-day resource procurement process (Cook & Schmitter-Edgecombe, 2009; Vinod Kumar, 2020). In smart living, there are guidelines, standards, and goals to achieve higher and better living and daily standards (Han & Kim, 2021).

The existence of financial technology is essential for realizing a smart city. (Jennifer & Widoatmodjo, 2023). Financial technology promotes commercial and technical advancement through vibrant digital platforms, enhances people's quality of life through more effective and efficient public services, reduces waste, and boosts efficiency in various facets of urban life.(Atsushi Deguchi, 2020; Krupkin & Gorodnova, 2018; Silva et al., 2018). Community activities in all cases no longer need to be done by visiting them, but can be done without having to leave the house. (Setyawati et al., 2021). The concept of one-stop shopping has become increasingly commonplace among the public, thanks to the development of payment systems that support financial technology applications. Financial technology is the outcome of the interaction between technology and financial services, which has progressively transformed the traditional business model into a more contemporary one. (Nirmawan & Astiwardhani, 2021). So that payments that previously had to be made face-to-face and carrying a certain amount of money become possible for more flexible transactions, and transactions that can be completed over the phone and in a matter of seconds (Sangwan, V., Prakash, P., & Singh, 2020). Financial technology is a tool that simplifies the transaction process and reduces the potential for fraud. (Mujiatun et al., 2022).

One of the most significant developments in the financial sector, which is rapidly expanding due to favorable laws, economic growth, and technological breakthroughs, is financial technology. As a result, it is a financial innovation that transforms the traditional financial system into a new business model by providing online financial services. (Leong, 2018). The use of financial technology by society is increasing, as evidenced by the increase in internet users. In 2019, the number of internet users was 128 million, increasing to 146 million in 2020, a 14% rise. In 2021, the number of users is expected to increase to 168 million, representing a 16% growth. In 2022, it is expected to continue growing rapidly, reaching 183 million users. (*Badan Pusat Statistik*, 2023). The increasing use of the internet shows that the general public has a good understanding of this technology. Financial technology is a rapidly developing field of financial management in response to advances in science and technology. Various factors, including technological advancements, regulations and policies, market demand, financial infrastructure, competition and innovation, security and privacy concerns, education and awareness, and economic considerations, influence its development and market, as well as collaboration and partnership, social and cultural conditions. (Diaz-Rainey et al., 2015; Kuo, 2011). Each of these factors contributes to affecting the overall growth and evolution of fintech. (Akinwale & Kyari, 2022; Hasif & Ahmad, 2019).

Financial technology offers a variety of significant

benefits for individuals, businesses, and economic systems. (Diaz-Rainey et al., 2015). Overall, fintech is bringing significant changes to the financial industry, making access easier, reducing costs, and increasing efficiency and security in various aspects of finance. (Leong, 2018). Research on the influence of financial technology in smart city development has not been conducted before, making it a new area of study. Most research discusses the influence of financial technology on economic behavior. (Irdawati et al., 2022; Jennifer & Widoatmodjo, 2023; Winarsih et al., 2024). Meanwhile, other research discusses the influence of financial technology on the performance of financial institutions. (Almashhadani & Almashhadani, 2023; Broby, 2021; Geby Citra Ananda et al., 2023). Education and awareness are two essential aspects in the world of technology, finance, and community development. Education and awareness play a crucial role in enabling individuals and groups to make informed decisions. (Lopes et al., 2018). Education is a process of learning and teaching that aims to enhance individual understanding, motivation, and skills. Education can take several forms, including non-formal, informal, and formal. (Morgan, 2021). In the context of fintech, education includes formal education, workshops, online resources, and financial literacy programs. (Doherty, O., & Stephens, 2023; Khan et al., 2023). Meanwhile, awareness is based on understanding and knowledge about a particular topic or issue, as well as its significance. Awareness often involves expertise and information, preparedness and proactive action, campaigns, and public interest feedback and evaluation.

Analyzing research phenomena associated with smart cities, this study aims to investigate how financial technology influences the growth of smart cities, taking into account the role of Indonesian students' awareness and knowledge. Through proper education, people can understand and utilize technology and services more effectively. At the same time, increased socialization levels help individuals make better decisions and protect themselves from harm—the two work together to provide a safer and more information-rich environment for all affected parties.

II. Literature Review

A. Smart City

To efficiently manage city assets, including public facilities, transportation systems, energy, waste, water, healthcare, and security, smart cities leverage big data, cloud computing, artificial intelligence (AI), information and communication technology (ICT), and the Internet of Things (IoT). Caragliu, A., Del Bo, C., & Nijkamp (2011) A smart city is one where social and human capital investments, combined with traditional (transport) and modern (ICT) communication infrastructure, support sustainable economic growth and enhance quality of life while ensuring responsible resource management.

The desire for more sustainable and efficient cities, the energy crisis, and the increase in urbanization all contributed to the development of the smart city idea in the early 1990s. Leading cities in the development of smart city initiatives include Singapore, Amsterdam, and Barcelona. (Matos, F., Vairinhos, V. M., Dameri, R. P., & Durst, 2017).

Among the elements propelling the development of smart cities are rapid urban population growth, scarce natural resources, the challenge of climate change, the need for effective public services, and the advancement of digital technology (Albino, V.,

Berardi, U., & Dangelico, 2015).

The following are indicators of a smart city. (Caragliu, A., Del Bo, C., & Nijkamp, 2011; Giffinger et al., 2007):

1. The Smart Economy

One of the key components of the smart city concept is the Smart Economy, which emphasizes the growth of an economy founded on entrepreneurship, innovation, global competitiveness, labor market flexibility, and the integration of digital technology into economic operations. In this situation, the economy depends on digital intelligence, creativity, and knowledge in addition to physical resources.

2. The smart people

The most intelligent people refer to the quality of human capital in a city, which is measured by the level of education, digital literacy, innovative capacity, and concern for education and daily life. This dimension focuses on the collective intelligence of city communities as the primary foundation for creating an intelligent city that is participatory and competitive.

3. The Smart Mobility

One of the key components of a smart city is smart mobility, which is defined as an urban transportation system that is digitally based, safe, integrated, efficient, and environmentally friendly. In addition to reducing traffic, pollution, and disparities in access to transportation, the objective is to ensure the quick, sustainable, and energy-efficient movement of people and goods.

4. The Smart Governance

Smart governance is the process by which local governments use digital technology to administer public services, policies, and community relations in an open, effective, and inclusive way. To enhance accountability, transparency, and public engagement in the decision-making process, the focus is on collaboration among stakeholders (government, community, and private sector) and the effective use of information and communication technology (ICT).

5. The Smart Environment

The term "smart environment" refers to city initiatives that manage the environment sustainably by utilizing innovation and technology to lower environmental impact, improve energy efficiency, preserve air and water quality, and judiciously manage waste and natural resources.

6. The Smart Living

The term "smart living" refers to the high standard of living that urban dwellers enjoy, thanks to the use of intelligent technology that enhances their housing, education, recreation, culture, lifestyle, security, and health.

B. Financial Technology

Financial technology (Fintech) is an innovation in the financial services industry that uses digital technology to make financial services more accessible, quick, inclusive, and efficient for the general public. The new economic sector, known as "fintech," uses technology to enhance financial operations. (Schueffel, 2016). Meanwhile, according to the Financial Services Authority, FinTech is the outcome of combining technology with financial services, which eventually transforms traditional business models to become more effective, inclusive, and technologically responsive.

Among the fintech indicators that are employed are (Gomber et al., 2018):

1. Number of Active Users

Indicates the number of people or businesses actively using a specific fintech service.

2. Transaction Volume

The total amount of money exchanged or the quantity of transactions handled by a fintech platform.

3.   Venture Capital Investment:

The amount of money invested in fintech startups or established businesses serves as a gauge of investor interest in the sector.

4.   Market Penetration

The proportion of people or prospective customers who make use of a specific fintech service.

5.   Product Innovation

The quantity and type of new goods that fintech businesses launch, such as AI-powered loan solutions, new investment platforms, or innovative payment methods.

6.   User Trust

Studies or surveys that gauge customer trust in financial systems may influence the uptake and expansion of these systems.

7.   Regulation and Compliance

Modifications to laws or regulations that affect the operations and business plans of fintech businesses

By improving the effectiveness of financial transactions, enhancing financial inclusion, and digitizing public services, financial technology, or FinTech, is essential to bolstering and expediting the deployment of smart cities. Cities become more responsive, transparent, inclusive, and focused on effective digital services when financial technology is incorporated. In addition to supporting the financial industry, fintech also enhances the city's digital ecosystem, enabling easy and real-time communication, payment, investment, and access to public services. (Arner, D. W., Barberis, J., & Buckley, 2016; Regalado-Pezua & Christofle, 2025).

Research by Pratama, B. P., & Firmansyah (2020), Hermawan, A., Priyono, A., & Putri (2021), Yoon, J., & Lee (2021), and Munir, M., & Maulani (2022) These are just a few of the numerous studies that assert that financial technology has a significant impact on smart cities. These studies demonstrate that FinTech enhances the efficiency of public payments, drives digital economic growth, and promotes the adoption of financial services in data-driven smart cities.

Several studies have found that FinTech can hurt smart cities, both directly and indirectly, mainly due to digital security risks, literacy gaps, and digital social inequality, as research conducted by Lee, I., & Shin (2018), Zetzsche et al. (2020), Karim et al. (2022), which states that in the smart city ecosystem, FinTech risks creating fragmentation of the financial system, especially if there is no data integration between local governments and digital financial service providers. This can hinder the integration of the city system, which should be integrated.

C. Education and Awareness

The methodical process of imparting values, information, and skills through official and informal institutions is referred to as education. (El-Hawary et al., 2003; Knowles, M. S., Holton, E. F., & Swanson, 2015). Awareness refers to the general population's knowledge or comprehension of significant topics, including public politics, technology, the environment, and digital rights. (Kharchenko Olga, 2011; Truman, 2017).

In the context of a smart city, education and awareness refer to creating a technologically educated, engaged, and prepared society to deal with social and digital transformation. (Bibri, S. E., & Krogstie, 2020). The following are markers of awareness and education. (Omrany et al., 2025):

1.   Technological Education Level

Residents who are proficient in using digital technology, whether at a basic or advanced level, and who can access online courses, workshops, and

technology training programs provided by educational institutions and organizations.

2. Knowledge of Environmentally Friendly habits

Knowledge of Environmentally Friendly Practices, namely the degree to which people are aware of sustainable habits like recycling, cutting back on plastic usage, and conserving energy.

3. Technology Access and Use

Families with internet access, gadgets such as laptops or smartphones, and smart technology applications used in daily life, including energy management, health, and transportation apps.

4. Participation in Smart City Initiatives

Citizens who participate in current smart city apps or initiatives, including citizen engagement platforms or city problem reporting systems, provide the quantity and caliber of resident input on public services and smart city projects.

5. Data Awareness and Knowledge

The degree to which citizens are aware of the significance of information security and privacy for personal data when using technology, as well as the availability of city government-managed public data, including statistics on sustainability, traffic congestion, and air quality.

6. Education and Social Awareness

The availability of educational initiatives that promote morality and social responsibility in technology use, as well as the success of initiatives aimed at increasing public awareness of topics such as cybersecurity, climate change, and responsible technology usage.

7. Evaluation and Surveys

These surveys assess residents' satisfaction with technology services, their level of awareness about smart city projects, and the effectiveness of educational programs designed to enhance the technical literacy and proficiency of community members.

Numerous studies have demonstrated the beneficial effects of public awareness and education on the establishment of smart cities. A smart city's success rate often depends on social preparedness and public engagement, which begins with understanding and education, as well as digital infrastructure. According to research by Albino et al. (2015), Kummitha (2019), and Bibri, S. E., & Krogstie (2020), Education and public awareness are the key pillars in achieving smart, sustainable cities. People with higher levels of education will be better equipped to adjust to technology-based systems and contribute to the sustainability of the urban environment. Therefore, e-governance awareness, or public knowledge of digital city governance, promotes accountability and openness in government.

However, despite the high degree of public education, several smart city projects failed, according to a study by Townsend (2013) and Mora et al., (2018).This means that without access to technology, sufficient infrastructure, and incentives for involvement, education is insufficient on its own. Therefore, a smart city is more about smart infrastructure than it is about "smart citizens." Designing technology that is accessible and egalitarian for all might be overshadowed by an overemphasis on citizen education.

III. Methods

Indonesian students, who comprised the study population, were given questionnaires to complete. Purposive sampling was used to get the research sample. Obtaining an appropriate model can be challenging with a large sample. To obtain precise interpretation estimates using the Structural

Equation Model (SEM), it is recommended that the sample size be between 100 and 200 respondents. (Hair, J. F., Anderson, R. E., Babin, B. J., & Black, 2010). For this reason, the sample size will be determined based on the results of the minimum sample calculation, specifically the number of indicators, which is 10 times the number of indicators, resulting in 120 respondents. This research uses a quantitative design using the Stata 17 program.

A. Proposed Model

The variables used in this research consist of the independent variable (smart city development), the dependent variable (financial technology), and the intervening variable (education and awareness). Smart city development has six indicators. (Pratama, 2014), namely Smart life, smart mobility, smart environment, clever government, smart people, and smart economics. Meanwhile, there are seven key financial technology indicators: the number of active users, transaction volume, venture capital investment, market penetration, product innovation, user trust, regulatory compliance, and adherence to regulations. (Hasif & Ahmad, 2019). There are seven education and awareness indicators, namely the level of technology education, environmental and sustainability awareness, access and use of technology, involvement in smart city initiatives, understanding and knowledge about data, education and social awareness, and evaluation and surveys. (Setyawati & Suroso, 2016).

B. Econometrics Specification

With an emphasis on awareness and education, this study examines the direct and indirect effects of financial technology on the development of smart cities through an analytical analysis using Structural Equation Modeling (SEM). Validity tests, reliability tests, autocorrelation, heteroscedasticity, multicollinearity, and normality tests are therefore required, as the structural equation is composed of independent variables that influence the dependent variable through intervening variables. (Hair, J. F., Anderson, R. E., Babin, B. J., & Black, 2010). The structural equation can be formulated as follows, along with a path diagram model (Fig. 1).

$$PS = a_1 + b_1\, FT + b_2\, ED + \varepsilon_1 \qquad (1)$$

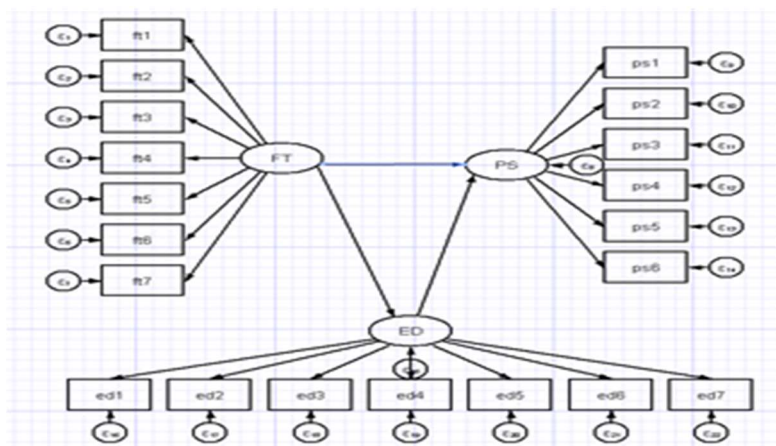$$ED = a_2 + b_3\, FT + \varepsilon_2 \qquad (2)$$

Figure 1. Path Diagram

IV. Results and Discussion

A. Research Estimation Summary

Tests for validity and reliability are necessary for the structural model represented by equations (1) and (2). If the computed r value is greater than the r table, the validity test is considered valid. Similarly, if the Cronbach alpha score is more than 0.6, the reliability test is considered trustworthy.

Furthermore, tests for autocorrelation, heteroscedasticity, multicollinearity, and normality are required. When the probability (Prob) is higher than 0.05, the data is considered normally distributed according to the Skewness/Kurtosis normality test. There are no signs of multicollinearity when the variance inflation factor (VIF) value is less than 10. This is the multicollinearity test. The estimate is free of heteroscedasticity issues when the Prob value > chi2 = 0.0799 is larger than alpha (0.05), as determined by the Breusch-Pagan and Weisberg heteroscedasticity test. There are no signs of autocorrelation, however, because the autocorrelation test employs the Breusch-Godfrey LM test, where Prob>|z| = 0.46.

To ensure that the structural model (SEM) constructed is statistically accurate, representative of the data, and trustworthy for making scientific inferences, the Goodness of Fit (GoF) metric is used to assess how well the SEM model represents the actual data. (StataCorp, 2023). Table 1 shows the conclusion of the GoF evaluation of the constructed model.

Table 1. The GoF Evaluation

Aspect	Value	Interpretation
RMSEA	0.065	Good fit
CFI	0.950	Very good fit
TLI	0.944	Very good fit
SRMR	0.041	Very good fit
CD	0.941	Very strong model
Chi-square p	0.000	Not a perfect fit (fair)
pclose	0.077	Moderate fit

Source : Stata

B. The empirical findings.

This study examines the impact of financial technology factors on the development of smart cities through raising education and awareness using path analysis. Table 2 displays the findings of the path analysis conducted for this investigation.

Table 2. Path Analysis Result

Standardized	Coef	Std. Err.	z	p>|z|	[95% Interval] Conf.	
Structural						
ps <-						
ed	0.545	0.110	4.94	0.00	0.329	0.761
ft	0.191	0.081	2.36	0.018	0.032	0.349
ed <-						
ft	0.728	0.087	8.38	0.000	0.558	0.898
var(e.ed)	0.108	0.025			0.068	0.171
var(ft)	0.406	0.072			0.287	0.575

LR test of model vs. saturated: chi2(167) =	250.90, Prob > chi2 = 0.0000

Source : Stata

Whereas Figure 2 displays the model's SEM builder analysis.

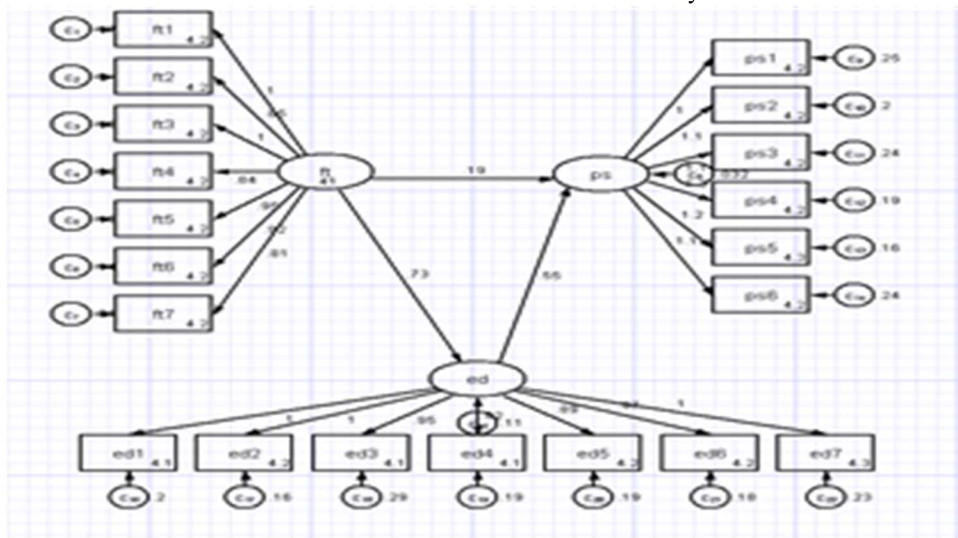**Figure 2**. SEM Builder Analysis

The following is the structural equation based on Table 2 and Figure 2.

PS = 0.191 FT*** + 0.545 ED***

ED = 0.728 FT***

Financial technology has a significant impact on the growth of smart cities; its value of 0.191 means that for every unit rise in smart city development, there will be a corresponding 0.191 unit increase in financial technology. In terms of accessibility, transparency, and financial efficacy, FinTech is viewed by students as a revolutionary technology that has a direct impact on several key features of smart city development. Students anticipate that FinTech will enable the decentralized, transparent, and real-time administration of government finances and payments. This makes it easier to administer e-procurement, e-tax, and smart budgeting, which reduces corruption, enhances accountability, and accelerates the construction of municipal infrastructure.

FinTech enables previously unbanked urban MSMEs and the community to access digital loans, crowdfunding, and microfinance, promoting the development of a smart economy and local digital-based innovation. By supporting digital payments for public transit, city utilities, and healthcare services, among others, e-wallets, QR codes, and mobile banking systems enhance smart mobility and smart living while boosting the convenience and productivity of city dwellers. City governments can more accurately and collaboratively define their investment requirements by utilizing big data and financial analytics from a FinTech platform. This will improve the efficiency of public expenditure and cooperation with private investors.

According to research by Yoon, J., & Lee, (2021), Hermawan, A., Priyono, A., & Putri (2021), and Munir, M., & Maulani (2022) By enhancing digital governance and the economic ecosystem in significant cities, fintech plays a crucial role in driving the growth of smart cities. This, in turn, promotes financial inclusion and the digitization of city services.

According to studies by Lee, I., & Shin (2018) and Karim et al. (2022), FinTech may lead to data fragmentation and fiscal imbalance in cities if it is not regulated correctly and integrated. It can also exacerbate digital exclusion in the towns if it is not balanced with infrastructure and literacy.

Education and awareness have a strong

positive influence on smart city growth, as indicated by their correlation coefficient of 0.545; that is, if smart city development increases by one unit, education and awareness will rise by 0.545 units. For smart cities, students and the broader community must embrace and utilize technology. If students obtain sufficient education, they will be better equipped to use digital platforms, city applications, and smart infrastructure (such as problem-reporting apps, smart transit systems, and smart health services). Without this understanding, the full potential of even the most sophisticated technology would not be realized.

Knowledgeable communities who understand their place in a smart city are more likely to take the initiative to voice concerns, offer suggestions, and take part in decision-making. As a result, the local administration can respond more quickly, enhance services, and develop solutions that better meet the needs of the populace. Public behavior changes, such as those related to energy consumption, trash management, or traffic patterns, are frequently necessary for the development of smart cities. Achieving the objectives of smart cities requires more sustainable and responsible behavior, which is fostered by education and awareness initiatives.

The beneficial effects of education and awareness on the development of smart cities are supported by research. Yigitcanlar et al. (2020), Abdollahzadeh, A., & Yigitcanlar, (2022), and Al-Saadoon, A. F., & Al-Thani (2023). According to the research, an integrated framework that links smart life and smart education creates "smart people." They contend that raising awareness and encouraging behavior that promotes the development of smart cities requires thorough education about sustainability and technology.

However, studies by Dameri & Ricciardi (2020), Angelidou & Psaltoglou (2021), and Lim, Y., & Lee (2022) Deny the beneficial effects of education and awareness on the development of smart cities, arguing that while education is crucial, additional obstacles can impede the benefits of raising awareness, such as a lack of efficient channels for participation, the digital divide, or resistance to change, in the sense that more study reveals impediments or prerequisites that need to be fulfilled for awareness and education to have the most significant possible impact.

With a rating of 0.728, financial technology has a significant impact on awareness and education. Accordingly, there will be a 0.728-unit rise in education and awareness for every unit increase in financial technology. The benefit stems from financial technology's ability to eliminate conventional barriers to accessing financial data and services.

Before the emergence of FinTech, only traditional financial institutions had access to complex and difficult-to-access financial data. FinTech offers platforms and apps that make this data more accessible through mobile devices, more aesthetically pleasing, and easier to comprehend. Numerous FinTech sites provide instructional materials on a range of financial topics, including articles, videos, infographics, and tutorials (e.g., investing, saving, lending, debt management). This content aims to raise financial knowledge and appeal to a broader audience informally. FinTech enables people who previously lacked access to traditional banking services to engage in the digital financial ecosystem. As more individuals conduct online transactions, they are inevitably exposed to financial concepts and procedures, which increases their knowledge.

C.   The role of mediation

Intervening factors, including awareness and education, influence the growth of smart cities and financial technology. According to the Baron and Kenny method of mediation analysis, utilizing the Sobel test, partial mediation occurs when the z-value is greater than 1.96 or the p-value (z) is less than 0.05. Table 3 presents the role of variables.

Table 3. Sobel Test Result

	Significance Testing of Indirect Effect (unstandardized)		
Estimates	Delta	Sobel	Monte carlo
Indirect effect	0.397	0.397	0.400
Std. Err.	0.084	0.093	0.093
z-value	4.715	4.258	4.281
p-value	0.000	0.000	0.000
Conf. Interval	0.232, 0.562	0.214 , 0.580	0.215, 0.578
RID		2.079	
RIT		0.675	

Source : Stata

Because the p-value is 0.000 < 0.05 and the z-value is 4.258 > 1.96, Table 3's Sobel test shows that the mediation is partial. When education and awareness, the mediating factors, account for a portion but not all of the link between financial technology and the growth of smart cities, this is known as partial mediation. In other words, even after accounting for the impacts of the mediating factors (education and awareness), financial technology (the cause) continues to have a significant direct influence on the development of smart cities (the effect).

The RID value of 2.079 indicates that the mediated influence is approximately 2.1 times larger than the direct influence of financial technology on smart city development. Meanwhile, the RIT value of 0.675 suggests that education and awareness mediate about 67.5% of the influence of financial technology on smart city development. Therefore, according to this view, the interaction between financial technology (FT) and the development of smart cities is mediated by education and awareness.

V.   CONCLUSION AND SUGGESTIONS

The effective integration of fintech in the creation of smart cities is facilitated by educating students and raising awareness. This is corroborated by statistical analysis findings that show financial technology has a significant and favorable influence on the development of smart cities, indirectly by raising awareness and educating people. For the goal of financial technology to realize smart city development through student education and awareness, it is necessary to carry out frequent education and training, awareness campaigns both through social and digital media as well as public campaigns, collaboration with stakeholders through government and private partnerships and local communities, access and inclusion, regulation and consumer protection, interactive educational platforms in the form of simulations and educational tools as well as evaluation and feedback. Future research is expected to include not only one variable that influences smart city development, but several variables such as green economy, community quality of life, and city management planning.

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