Research on Smart Logistics Under the Background of Guangzhou Smart City-the Role of New Infrastructure Construction and Logistics Policies

Shuangshuang Zhang[a], Noorliza Karia*, Khaw Khai Wah*

School of Management, Universiti Sains Malaysia, Malaysia

[a]e27776697shuang@student.usm.my
*Corresponding author: noorliza@usm.my (Noorliza Karia), khaiwah@usm.my (Khaw Khai Wah)

Abstract. Purpose: To empirically study the positive impact of smart logistics on the sustainable development of smart cities, while new infrastructure construction plays a mediating role and logistics policy guidance plays a moderating role.
Methodology: Conduct a questionnaire survey on logistics enterprises in Guangzhou and analyze it using SEM-PLS.
Findings: The relationship between smart logistics and the sustainability of smart cities is positively correlated,while new infrastructure construction plays a mediating role and logistics policy guidance plays a moderating role.
Research limitations: This study is limited to commercial respondents in Guangzhou, which may limit the generalizability of the survey results.
Practical significance: Combining practical engineering with theory to make the implementation of Guangzhou's smart logistics project more scientific, has warning and guiding significance for the implementation of Guangzhou's smart city project.
Originality/value: This study explores the relationship between smart logistics, new infrastructure construction, logistics policies, and the sustainability of smart cities, which is still the first in smart city literature;

Keywords: Smart Logistics , Smart City Sustainability, New Infrastructure Construction, Logistics Policies, SEM-PLS

1 Introduction

General Secretary Xi Jinping emphasised the importance of utilising advanced technologies like big data, cloud computing, blockchain, and artificial intelligence to drive innovation in urban management methods, models, and concepts. This progression from digitalisation to intelligence and ultimately to wisdom is crucial for enhancing the

C. W. K. Chen et al. (eds.), *Proceedings of the 9th International Conference on Engineering Management and the 2nd Forum on Modern Logistics and Supply Chain Management (ICEM-MLSCM 2024)*,
Advances in Engineering Research 243,
https://doi.org/10.2991/978-94-6463-531-7_22

intelligence and efficiency of cities, and is the sole path towards advancing the modernisation of urban governance systems and capabilities [14]. "As a prominent urban centre at the national level and the primary city within the Guangdong-Hong Kong-Macao Greater Bay Area, Guangzhou regards the construction of Smart Guangzhou as a major strategy for urban development[15]. Relevant departments have formulated policy documents and basic plans for the construction of smart cities[27].By 2015, a smart city operation system with extensive information network coverage, highly concentrated intelligent technology, high-end development of intelligent economy, and efficient and convenient intelligent services will be initially established. In 2020, the added value of the city's digital economy will be 1.3 trillion yuan, accounting for 48.5% of GDP, due to the smart city operation system [4]. The digital economy is becoming an important engine for Guangzhou's economic growth. At the fourth session of the 16th Guangzhou Municipal People's Congress in 2024, the Guangzhou Municipal Government proposed to "build a higher level of smart Guangzhou[4]."

Guangzhou is a significant global economic hub and a comprehensive transportation centre in China. serving as a material distribution and logistics center connecting the Pearl River Delta, Hong Kong, and Macau. In 2020, the "Guangzhou Smart Internet Logistics Center" project led by the Guangzhou Municipal Government was launched [4]. At present, the network or information processing has been basically fully implemented, but the application of core technologies in the Internet of Things is still in its early stages.

Through the analysis of the current situation, it is not difficult to find that Guangzhou's smart city and urban logistics possess a specific basis. Regarding smart cities, the future progress direction of Guangzhou's urban logistics should also be more intelligent urban logistics. How can smart logistics further develop under the booming development of smart cities? Meanwhile, the development of smart logistics can also promote the sustainable development of smart cities and play a guiding role in new infrastructure construction and government policies. This indicates insufficient empirical evidence research on how the topic of intelligent logistics can promote the sustainability of smart cities through new infrastructure construction and logistics policies.

Therefore, this paper In order to conduct a systematic investigation into the tangible benefits of intelligent logistics on the long-term growth and environmental stability of urban areas, while new infrastructure construction plays a mediating role and logistics policy guidance plays a moderating role. The following research questions (RQ) are used to address these goals:

RQ1: Is there positive correlation between smart logistics and smart city sustainability?

RQ2: Is there positive correlation between smart logistics and new infrastructure construction?

RQ3: Is there positive correlation between new infrastructure construction and smart city sustainability?

RQ4: Is there positive relationship between smart logistics with smart city sustainability correlates positively mediated by new infrastructure construction?

RQ5: Is there positive relationship between smart logistics with new infrastructure construction correlates positively moderated by logistics policies?

The subsequent sections of the paper are structured as follows: Section 2 conducts a literature analysis to gather previous research on smart logistics and smart cities, which then leads to the formation of hypotheses in Section 3. Section 4 defines the methodology used in the study. Section 5 presents the results obtained, and Section 6 gives the conclusion.

2 Literature Review

2.1 Smart Logistics

Smart logistics is a contemporary logistics paradigm that leverages intelligent technologies including software, hardware, the Internet of Things, and big data to enable the deployment of advanced, flexible, and visually-oriented management of various logistical links. This results in more intelligent analysis, decision-making, and automated operation execution capabilities inside logistics systems, hence enhancing the efficiency of logistics operations[24]. Hribernik K.A. believes that in technical literature, intelligent logistics entities can be divided into two categories: intelligent resources and intelligent products/shipments[11]. Blecker T., Kersten W.,Ringle Ch. M. believes that smart logistics encompasses ubiquitous technological applications that improve efficiency in transportation, warehousing, and storage processes. Miragliotta G believes that intelligent logistics can achieve supply chain traceability, anti-counterfeit cold chain monitoring brands, prevent gray market protection, manage fleet and vehicle monitoring, and provide internal safety and security solutions for logistics facilities [21]. Kirch M.. believes that smart logistics area defines the concept of multi-purpose technology systems for identifying, locating, and monitoring the status of different object levels in logistics and production processes. Singh P.M. believes that smart logistics consists of a series of activities that help achieve expected goals [5].

2.2 Smart City

Smart city is a city that strives to enhance its intelligence, sustainability, efficiency, fairness, and liveability [28]. Smart city is a well-defined geographical region that integrates advanced technologies, including information and communication technology (ICT), logistics, and energy production, to enhance the well-being, inclusion, participation, environmental quality, and intelligent growth of its citizens. The city's governance and growth are overseen by a designated body of individuals who determine the regulations and policies [3]. According to an often mentioned definition, smart cities integrate physical, social, IT, and business infrastructures in order to improve their overall intelligence [8], Lai's study examined the technical criteria linked to smart cities in order to establish a clear definition of the smart city idea[12], Smart city infrastructure is progressively adopting Industry 4.0 technologies [18], Cyber-physical systems, the Internet of Things, the Internet of Services, Cloud Computing, and Big Data, are all interconnected with the Internet of Data, the Internet of Energy, and the Internet of People [20], to facilitate smart city initiatives refer to efforts aimed at implementing advanced technologies and systems to improve urban areas. These initiatives focus on decentralisation, which involves distributing decision-making power and resources across different levels of government or organisations. Additionally, smart city initiatives emphasise real-time monitoring and management capabilities, allowing for immediate and efficient response to various urban challenges. Modern smart city need to be designed for scalability, operational efficiency, and planning flexibility[2], and citizens should be regarded as essential players in smart initiatives rather than mere users.

2.3 New infrastructure Construction

CCTV News condensed the concept of "new infrastructure" into seven categories on March 2, 2019. The mentioned items include 5G infrastructure, ultra-high voltage systems, intercity high-speed railways, intercity rail transit, new energy car charging stations, big data centres, artificial intelligence, and industrial Internet [26]. The main components encompassed are information infrastructure, integrated infrastructure, and innovation. Three key components of modern infrastructure [9]. This article believes that the conceptual boundary of this viewpoint is relatively vague and not rigorous enough. In April 2020, the National Development and Reform Commission established a definition for new infrastructure. This type of infrastructure is characterised by its alignment with new development concepts, its reliance on technological innovation, its utilisation of information networks, and its focus on meeting the requirements for high-quality advancement. The new infrastructure is designed to offer services such as digital transformation, intelligent updating, and integrated innovation [10]. From the perspective of complex systems, new infrastructure is a dynamic and open social and technological system with diverse digital capabilities, a large stock base, and social participation[22]. The new infrastructure will serve multiple purposes for China. In the short term, it will assist in managing the effects of COVID-19, boosting domestic demand, and stabilising economic growth and employment. In the long term, it will establish a solid foundation for promoting economic growth, enhancing the well-being of the population, and strengthening China's competitiveness in the global market [15] .

2.4 Logistics Policy

Logistics policy is a public policy created by a country or government to ensure the efficient and sustainable functioning of logistics across society, as well as government intervention in logistics activities throughout society. Specifically, it includes laws, regulations, plans, measures (countermeasures) related to logistics, as well as direct guidance from the government on logistics activities throughout society. Xia Chunyu analyzed the structural system of logistics policies in China and believed that logistics policies include two forms: legal and administrative. Administrative logistics policies refer to the notices and opinions issued by government departments in the field of logistics [6]. Haifeng et al. believe that the logistics industry policy system includes three aspects: industrial structure policy, industrial organization policy, and industrial development policy. Among them, logistics industry structure policies are reflected in logistics infrastructure construction, support for logistics enterprises, and improvement of market mechanisms. The logistics industry organization policy focuses on establishing a standardized market environment, and industrial development policies include technology policies, industrial layout policies, financial policies, etc [13]. Skowrońska highlighted that implementing efficient measures to safeguard the market against excessive consolidation and monopolies might enhance logistics performance. Multiple studies have been carried out to assess the effectiveness of enhancing corporate governance [17]. NohH. S. starts from the perspective of studying the content of the Basic Law on Logistics Industry and Logistics Policy in South Korea, and studies the changes in the content of the Basic Law on Logistics in South Korea; Hesse 127 conducts empirical research from the perspective of commodity circulation policy, combining commodity circulation policy with local urban logistics[19]; From the perspective of industry policy environment research, Charlie et al. believe that the policy environment of the logistics industry is an important factor affecting industry competitiveness[1].

2.5 Hypothesis Development

The concept of this study is to accelerate the construction of smart logistics and promote the development of Guangzhou's smart city. The significant achievements in the development of urban logistics industry are closely related to the planning and development of smart city informatization. The logistics industry flexibly utilizes information technology to organically combine transportation, warehousing logistics, loading and unloading, transportation, express sorting, and delivery, forming a complete and efficient supply chain management. Smart logistics promotes the construction of new infrastructure. With the development of the Internet of Things, information connectivity has extended to the physical world, giving it a awakening of life; Smart logistics is everywhere. The logistics Internet has made the flow of physical goods such as agriculture, manufacturing, trade and circulation fully interconnected and integrated, and has become a new infrastructure. To meet the needs of the development of smart logistics industry, the government has introduced a series of policies to guide and promote the digital transformation of the logistics industry, pointing out the direction for logistics development. The model is shown in Figure 1.

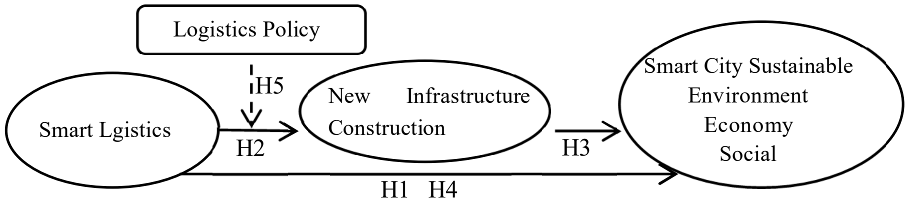

Fig. 1. :Conceptual model for sustainable smart cities with smart logistics.

Based on the concept diagram, we propose the following assumptions:

H1:The relationship between smart logistics and the sustainability of smart cities is positively correlated.

H2:The relationship between smart logistics and the construction of new infrastructure is positively correlated.

H3:The relationship between the construction of new infrastructure and the sustainability of smart cities is positively correlated.

H4:There is a positive correlation between intelligent logistics and the sustainability of smart cities, and it is mediated by new infrastructure construction.

H5:There is a positive correlation between intelligent logistics and the construction of new infrastructure, and it is moderated by logistics policies.

3 Methods

Determining the appropriate sample size continues to be a challenging question. Therefore, PLS-SEM was applied in this study, also has broad application prospects. According to Gpower calculation, the minimum sample size is 82, Thus, the sample size of 106 companies in this study represents the main characteristics of enterprises in the smart logistics industry.

The questionnaire was prepared in accordance with the online survey methodology outlined by Dillman [7]. The multi-item questionnaire was derived from existing research and employs a seven-point Likert scale, with responses ranging from 1 (indicating strong disagreement), 4 (indicating neutrality), to 7 (indicating strong agreement). Data collection was conducted using a survey-based questionnaire method. This questionnaire is specifically developed to assess several aspects of smart city sustainability, encompassing 14 variables that span economic performance, environmental performance, and social performance. The 10 indicators of smart logistics are adapted from early research; The 6 indicators of new infrastructure construction are adapted from early research; The 4 indicators of logistics policy are adapted from early research.

We reached out to a total of 550 suppliers, distributors, retailers, urban goods forwarders, and IT vendors in Guangzhou via WeChat groups. A cross-sectional survey was done utilising a questionnaire, with a total of 120 individuals consenting to participate. Out of the 109 participants who took part in the online survey, three of them were discovered to be incomplete. After removing these three items, a total of 106 replies (with a response rate of 88.33%) were kept for analysis. Data was gathered between April and July 2023.

4 Results

Most of the respondents were male, accounting for 70.5%, with over 40% having a bachelor's or master's degree, and over 57% having over 5 years of experience in their respective organizations. In contrast, the majority of respondents belong to the following categories: operations/supply chain logistics managers (45%), mid-level managers (22%), and IT managers (17%). 84% of the sample population participated in this survey.

All constructs that were kept satisfied the minimum criteria for loadings (≥0.7), Cronbach's α (≥0.7), composite reliability or CR (≥0.7), and average variance extracted or AVE (≥0.5) as shown in Table 1. Two assessments were administered to establish the extent to which the variables can be distinguished from one another. The Fornell and Larcker Criterion and HTMT ratio (≤0.85) are two methods used for evaluation. Their individual outputs are denoted as Table 2 and Table 3, respectively.

In order to validate the HTMT results, the bootstrap HTMT confidence intervals are presented in Table 4. The table demonstrates that both the original sample and the sample means fall within the upper and lower confidence intervals, and there are no values within the range between the 5% and 95% confidence intervals [16]. The accuracy of the HTMT discriminant validity results has been confirmed. The bootstrap findings, displayed in Table 5, present the outcomes of the hypotheses. Figure 2 displays the diagram of the model path.

Table 1. Internal consistency/loadings, reliability and convergent validity.

Construct	Measurement item	Loading	Cronbach 'sα	CR	AVE
logistics policies (LP)	lp1	0.744	0.899	0.899	0.692
	lp2	0.842			
	lp3	0.818			
	lp4	0.915			
smart logistics (SL)	sl1	0.743	0.937	0.936	0.596
	sl2	0.789			
	sl3	0.850			
	sl4	0.774			
	sl5	0.855			
	sl6	0.713			
	sl7	0.763			
	sl8	0.732			
	sl9	0.784			
	sl10	0.706			
Environmental performance (EP)	ep1	0.840	0.96	0.96	0.775
	ep2	0.834			
	ep3	0.870			
	ep4	0.966			
Financial Economy performance (FP)	fp1	0.782	0.962	0.962	0.782
	fp2	0.833			
	fp3	0.933			
	fp4	0.966			
	fp5	0.910			
New Infrastructure Construction (NIC)	ni1	0.882	0.934	0.933	0.699
	ni2	0.837			
	ni3	0.871			
	ni4	0.808			
	ni5	0.721			
	ni6	0.886			

Social Performance (SP)	sp1 sp2 sp3 sp4 sp5	0.735 0.731 0.870 0.815 0.812	0.895	0.895	0.631

Table 2. Fornell and Larcker criterion.

	LP	SL	EP	FP	NIC	SP
LP	**0.832**					
SL	0.407	**0.772**				
EP	0.535	0.675	**0.88**			
FP	0.581	0.482	0.547	**0.884**		
NIC	0.561	0.678	0.573	0.537	**0.836**	
SP	0.547	0.636	0.669	0.483	0.726	**0.794**

Table 3. Heterotrait-monotrait ratio (HTMT).

Construct	LP	SL	EP	FP	NIC SP
SL	0.403				
EP	0.536	0.673			
FP	0.580	0.477	0.546		
NIC	0.559	0.674	0.567	0.535	
SP	0.544	0.633	0.666	0.476	0.724

Table 4. HTMT confidence intervals.

Bi-lateral Relationships	Original Sample (O)	Sample Mean (M)	5.0%	95.0%
LP - > SL	0.403	0.401	0.257	0.535
EP - > SL	0.536	0.535	0.438	0.624
EP - > LP	0.673	0.670	0.564	0.764
FP - > SL	0.580	0.577	0.464	0.679
FP - > LP	0.477	0.475	0.351	0.586
FP - > EP	0.546	0.546	0.445	0.638
NIC - > SL	0.559	0.558	0.462	0.647
NIC - > LP	0.674	0.674	0.564	0.768
NIC - > EP	0.567	0.565	0.449	0.665
NIC - > FP	0.535	0.534	0.423	0.637
SP - > SL	0.544	0.544	0.436	0.648
SP - > LP	0.633	0.631	0.511	0.738
SP - > EP	0.666	0.662	0.545	0.761
SP - > FP	0.476	0.475	0.364	0.581
SP - > SC	0.724	0.723	0.638	0.798

Table 5. hypotheses results.

Hypotheses	Content	Status
H1	The relationship between smart logistics and the sustainability of smart cities is positively correlated.	Support
H2	The relationship between smart logistics and the construction of new infrastructure is positively correlated.	Support
H3	The relationship between the construction of new infrastructure and the sustainability of smart cities is positively correlated.	Support
H4	There is a positive correlation between intelligent logistics and the sustainability of smart cities, and it is mediated by new infrastructure construction.	Support
H5	There is a positive correlation between intelligent logistics and the construction of new infrastructure, and it is moderated by logistics policies.	Support

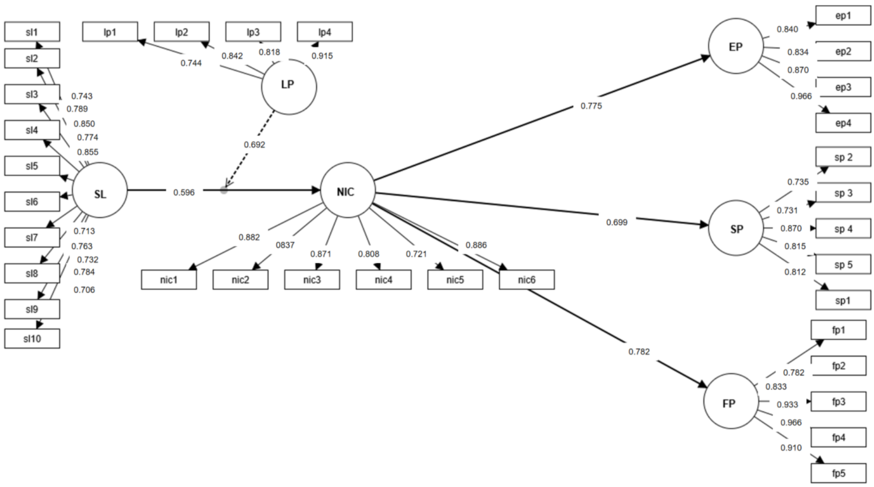

Fig. 2. Research Model Path Diagram

5 Conclusion

This study examined the influence of smart logistics on the sustainability of smart cities, as well as the significance of new infrastructure development and logistics regulations. The research findings, obtained through surveys and SEM methods, demonstrate that smart logistics has a beneficial effect on the sustainability of smart cities. Additionally, the establishment of new infrastructure acts as a mediator between smart logistics and the sustainability of smart cities, while logistics policies serve as a moderator between smart logistics and the development of new infrastructure.

This study examines the correlation between smart logistics, new infrastructure development, logistics regulations, and the sustainability of smart cities. It is the first of its kind in the field of smart city literature. This work contributes significantly to the knowledge base in smart city logistics from both a technological and management standpoint. This study employs an interdisciplinary approach that integrates the fields of business and engineering.

This study has the potential to improve the effectiveness of smart logistics development by reinforcing the construction of new infrastructure during the era when smart city policies are providing benefits. Consequently, it will offer valuable information for urban planners and decision-makers, enabling them to effectively engage with the entities accountable for freight transportation. By implementing this strategy, both enterprises and citizens will reap the advantages of these sophisticated ecosystems.

Nevertheless, this study only includes participants from the commercial sector in Guangzhou, which could restrict the applicability of the survey findings. Hence, forthcoming research have to incorporate viewpoints from additional urban areas.

References

1. Barron, C. (2023). *A Logistical Perspective on Dynamic Purchasing Systems: Investigating the Supplier Perspective*. https://www.diva-portal.org/smash/record.jsf?pid=diva2:1768373
2. Bibri, S. E., & Krogstie, J. (2017). Smart sustainable cities of the future: An extensive interdisciplinary literature review. *Sustainable Cities and Society*, *31*, 183–212.
3. Dameri, R. P. (2013). Searching for smart city definition: A comprehensive proposal. *International Journal of Computers & Technology*, *11*(5), 2544–2551.
4. Deng Maoying&Deng Cefang (2023). Smart Land Spatial Planning Practice under Data Empowerment - Taking Guangzhou as an Example Tropical Geography, 43 (12), 2311-2320
5. Erdal, N. (2024). 4.0 Use of Smart Technologies in Logistics and Supply Chain Management: An Example of Smart Gloves. *Akademik Sosyal Araştırmalar Dergisi*. https://acikerisim.gelisim.edu.tr/xmlui/handle/11363/7314
6. Gan, X.-L., Xie, K., Liu, H., Rameezdeen, R., & Wen, T. (2023). A bibliometric and content analysis of policy instruments on facilitating the development of prefabricated construction in China. *Engineering, Construction and Architectural Management*, *30*(9), 3976–3996.
7. Greenberg, P., & Dillman, D. (2023). Mail communications and survey response: A test of social exchange versus pre-suasion theory for improving response rates and data quality. *Journal of Survey Statistics and Methodology*, *11*(1), 1–22.
8. Harrison, C., Eckman, B., Hamilton, R., Hartswick, P., Kalagnanam, J., Paraszczak, J., & Williams, P. (2010). Foundations for smarter cities. *IBM Journal of Research and Development*, *54*(4), 1–16.
9. Hong, J., Shi, F., & Zheng, Y. (2023). Does network infrastructure construction reduce energy intensity? Based on the "Broadband China" strategy. *Technological Forecasting and Social Change*, *190*, 122437.
10. Hu, J., Zhang, H., & Irfan, M. (2023). How does digital infrastructure construction affect low-carbon development? A multidimensional interpretation of evidence from China. *Journal of Cleaner Production*, *396*, 136467.
11. Kansy, D. (2023). Technological Conditions for Logistics 4.0 Development. *Scientific Papers of Silesian University of Technology. Organization & Management/Zeszyty Naukowe Politechniki Slaskiej. Seria Organizacji i Zarzadzanie*, *170*. https://managementpapers.polsl.pl/wp-content/uploads/2023/06/170-Kansy.pdf

12. Lai, C. S., Jia, Y., Dong, Z., Wang, D., Tao, Y., Lai, Q. H., Wong, R. T., Zobaa, A. F., Wu, R., & Lai, L. L. (2020). A review of technical standards for smart cities. *Clean Technologies*, *2*(3), 290–310.
13. Li, M., & Wang, J. (2023). The productivity effects of two-way FDI in China's logistics industry based on system GMM and GWR model. *Journal of Ambient Intelligence and Humanized Computing*, *14*(1), 581–595. https://doi.org/10.1007/s12652-021-03314-6
14. Liu Feng (2021). The origin, development, and future trends of the urban brain People's Forum · Academic Frontiers, 9, 82-95
15. Qiu, L. (2023). Does internet infrastructure construction improve corporate green innovation? Evidence from China. *Sustainability*, *15*(1), 807.
16. Rady, M., Kineber, A. F., Hamed, M. M., & Daoud, A. O. (2023). Partial least squares structural equation modeling of constraint factors affecting project performance in the Egyptian building industry. *Mathematics*, *11*(3), 497.
17. Sadowski, A., Misztal, A., Kowalska, M., Engelseth, P., Bujak, A., & Skowron-Grabowska, B. (2023). *The Impact on Environmental Taxes on Transportation and Storage Enterprises' Development–The Case of Balkan Countries.* https://munin.uit.no/handle/10037/33220
18. Safiullin, A., Krasnyuk, L., & Kapelyuk, Z. (2019). Integration of Industry 4.0 technologies for "smart cities" development. *IOP Conference Series: Materials Science and Engineering*, *497*(1), 012089. https://iopscience.iop.org/article/10.1088/1757-899X/497/1/012089/meta
19. Schneider, C. P. (2024). Innovative German technology in sub-Saharan Africa: Where is it used? *International Journal of Technology Management & Sustainable Development*, *22*(3), 245–273. https://doi.org/10.1386/tmsd_00077_1
20. Tran-Dang, H., Krommenacker, N., Charpentier, P., & Kim, D.-S. (2020). Toward the internet of things for physical internet: Perspectives and challenges. *IEEE Internet of Things Journal*, *7*(6), 4711–4736.
21. Vasudevan, A., Varughese, A., Raman, A., John, S., Sagadavan, R., Ramachandran, S. D., & Sam, T. H. (2023). Study on the Factors Influencing Customer Satisfaction towards SME Logistics Industry During Pandemic Covid-19 in Klang Valley, Malaysia. *Res Militaris*, *13*(2), 1491–1506.
22. Wang, T., Xu, J., He, Q., Chan, A. P., & Owusu, E. K. (2023). Studies on the success criteria and critical success factors for mega infrastructure construction projects: A literature review. *Engineering, Construction and Architectural Management*, *30*(5), 1809–1834.
23. Wang Shifu, Zhang Hong,&Liu Zheng (2018). Reflection on Guangzhou's Moving towards a Global City in the Era of Guangdong Hong Kong Macao Greater Bay Area Urban observation, 3, 7-14
24. Wang Yiying&Tian Xueying (2023). Research on the Development Challenges and Countermeasures of Unmanned Retail in the Digital Intelligence Era Operations Research and Fuzziology, 13, 847.
25. Wu Xibo&Yang Zaigao (2010). Guangzhou's vision for building a smart city Urban observation, 6, 167-176
26. Zou, W., & Pan, M. (2023). Does the construction of network infrastructure reduce environmental pollution?—Evidence from a quasi-natural experiment in "Broadband China". *Environmental Science and Pollution Research*, *30*(1), 242–258.
27. Zhang Xiangyang and Yuan Zepei (2013). Research on the Integration and Development Path of Guangzhou's Smart City and Smart Industry Technological Progress and Countermeasures, 30 (12), 47-50
28. Zubizarreta, I., Seravalli, A., & Arrizabalaga, S. (2016). Smart City Concept: What It Is and What It Should Be. *Journal of Urban Planning and Development*, *142*(1), 04015005.