

Aligning AI Readiness and Sharing Digital Equity Efficiencies: plan for Smart City

Dae-Sung Seo

Professor, Department of Paideia, Sungkyul University
E-mail :dais3@sungkyul.ac.kr

Abstract

This study explores the significance of AI-driven smart cities and their geopolitical implications, focusing on efficient smart economies, social and environmental connectivity, and sustainability. France is leading in AI development and adoption within Europe, possessing the necessary infrastructure and technology for smart city implementation, yet it must address social inequality and the digital divide. Japan is leveraging AI for smart city development to tackle its aging population, excelling in technology innovation and infrastructure, but it faces challenges in social acceptance and data privacy. Ireland, as a European hub for major IT companies, is well-positioned for AI smart city construction, though it must overcome issues like housing shortages and infrastructure expansion. The Netherlands must address social conflicts and housing shortages caused by high population density and increasing immigration. For successful AI smart city development, it is crucial to integrate immigrants, expand housing, and create economic opportunities. South Korea's major platforms like Naver and Kakao, are poised to play a central role in the AI smart city era, leveraging their vast data analytics capabilities, robust telecommunications infrastructure, and strong user base to enhance global competitiveness.

Keywords: *AI, Geopolitical-Coordination, Platform, Innovation, Shared Cities, Urban Resources, Smartilization.*

1. Introduction

The current AI-centered world is undergoing rapid changes due to technological advances and political changes. In particular, the reorganization of the global supply chain has a great influence on the international economy and individual lifestyles. The purpose of this paper is to analyze the smart digitalization city of the world's change and suggest how to respond to these changes.

The development of AI is significantly transforming urban and economic structures, driving rapid changes in modern society. These shifts have profound impacts on energy and financial systems, requiring nations and businesses to adapt and find ways to leverage these new realities. This paper addresses the energy and financial challenges in AI-driven cities, modeling global economic changes and corresponding strategic responses. First,

Manuscript Received: September. 18, 2024 / Revised: September. 23, 2024 / Accepted: September. 28, 2024
Corresponding Author: dais3s@gmail.com
Tel: +8231-467-8068, Fax: +8231-467-8114
Professor, Department of Paideia, Sungkyul University, Korea

the energy issues in AI-centric cities are highlighted. As AI advances, cities are consuming increasingly more power, making efficient energy management and the use of renewable resources crucial. Second, the paper discusses the rising energy demand and the need to expand resources and power infrastructure to meet this growing need. Third, AI-driven infrastructure is being developed in cities, leading to the formation of urban areas equipped with data centers, smart grids, and autonomous vehicles. While these AI technologies significantly increase energy consumption, they also contribute effectively to urban growth. Fourth, strategies to meet diverse energy demands through the use of renewable energy sources, such as solar and wind power, are being considered. Utilizing renewable energy is essential for managing the rising energy needs of AI-centric cities. Fifth, AI-based energy management is key. In AI-centered cities, smart grids can collect and analyze real-time power usage data, maximizing energy efficiency. By leveraging AI, these cities can analyze power consumption patterns and develop optimal energy usage strategies.

However, securing financial resources poses a challenge for AI-driven cities. Building such cities requires substantial financial investment, significantly impacting the financial strategies of nations and corporations. Continuous financial investment and cost management are crucial for AI-based cities, which can be supported through public and private investments focused on the sharing economy. Collaboration between governments and businesses is essential for establishing AI infrastructure, with a focus on funding from city revenues rather than relying on external investments. Utilizing AI technology to enhance administrative efficiency and reduce unnecessary expenditures can also lead to cost savings.

Furthermore, the development of AI technology and infrastructure not only creates jobs within new urban areas but also in the globalized metaverse regions. AI fosters innovation in existing industries, transforming them into new business models and markets.

Smart city development is heavily influenced by policy decisions. The team of former U.S. President Donald Trump is reportedly planning a 'Manhattan Project' aimed at advancing AI military technology and revisiting regulations established under President Joe Biden. This initiative includes drafting an executive order to prioritize substantial investment in AI-driven military technologies. The project aims to establish industry-centered institutions focused on AI model research and protecting domestic systems from foreign AI technologies, with the overarching goal of positioning the United States as a leader in the AI sector. Additionally, the proposed executive order directs high-level officials, such as the Secretary of Defense, to prioritize the allocation of high-performance computing resources for AI applications. This is reminiscent of the Trump administration's 2019 AI initiative, which sought to safeguard American dominance in the AI field.

"AI smartilization" can be interpreted as the process of "smart transformation" or "smart urbanization" of cities, where technology and data are integrated into the urban infrastructure to enhance efficiency, sustainability, and quality of life. However, since AI smartilization is not a standard term, it's better to use "smart transformation" or simply "smart city development" to convey this idea more clearly in formal writing. A stable geopolitical environment fosters the AI smartilization of cities, enabling them to adapt and evolve more efficiently. This stability provides a robust foundation for the continuous adoption of new technologies and infrastructure improvements, ensuring that cities remain resilient and capable of growth in a rapidly changing world. This paper emphasizes the importance of stability in facilitating the development of smart cities.

2. Prior studies

2.1 Power and Finance in AI-Centered Cities

To prevent accidents, global cities are increasingly adopting AI-based autonomous driving (AD) technologies. Research indicates that cities implementing AD and mobility solutions are likely to become global hubs. While cities like Shanghai are making progress, others such as San Francisco and New York are facing challenges. Successful AD cities prioritize technology and public trust and are expected to have well-developed infrastructure. The potential for AD success varies based on urban complexity (population density), economic scale (GRDP), patents, consumer numbers, and infrastructure quality (public EV chargers and road conditions). An empirical analysis of New York's failures in AV deployment highlights that AD success is influenced by urban density and infrastructure. Existing studies conclude that building AI infrastructure is crucial for achieving autonomous mobility and economic growth. [1].

To transform cities into smarter and more efficient environments, selective nations need to proactively detect and maintain urban infrastructure, including road signs and cleaning up illegally dumped waste. Currently, maintenance tasks largely rely on citizen reports or field inspections by municipal staff, which are time-consuming and costly, often resulting in significant delays that negatively impact communities. This paper introduces AI and IoT-based urban-scale detection framework, AIoT-CitySense, developed and piloted in collaboration with local Australian governments. AIoT-CitySense is designed to address the specific needs of road infrastructure maintenance within local government areas. The customized solution has been deployed on existing waste service trucks covering approximately 100km of road network, achieving an impressive 85% improvement in preemptive detection compared to manual reporting processes. AIoT-CitySense has the potential to transform various domains, including efficient pothole detection and accurate lane markings for pedestrians. This paper demonstrates how leveraging AI and IoT technologies can drive tangible changes and enhance the quality of urban life by utilizing city-wide data [2].

The globalization of smart digital technologies suggests that smart mobility solutions can develop dynamic capabilities when integrating identified resilience factors. These solutions help emerging cities overcome modal fragmentation and infrastructure barriers, thus reducing travel times. Consequently, research supports the dynamic capabilities theory by arguing that each emerging city should incorporate key resilience factors into its smart mobility solutions to develop unique dynamic capabilities tailored to its specific environmental conditions [3].

Existing research highlights that community welfare focuses on improving the overall quality of life for urban residents. In contrast, urban design emphasizes the physical layout and organization of urban areas to enhance livability, while smart cities use technology to improve urban services and sustainability. The research underscores the impact of urban design on the integration of community welfare and smart city initiatives, stressing the importance of rigorous and comprehensive long-term community planning. It provides insights into the components used for integrating community welfare, urban design, and smart city elements [4].

Cities are recognized as the next frontier for artificial intelligence (AI). As smart city environments become feasible and even preferred, AI offers opportunities to further advance through infrastructure and industry activation. However, despite the abundance of opportunities, without thorough research to guide the complex development and implementation processes, urban environments could become chaotic and potentially hazardous for citizens [5].

Interest in Smart Cities (SC) and Big Data Analytics (BDA) has grown in recent years, revealing the strong

connection between the two fields. SCs are complex systems involving various stakeholders, from planners to citizens. In this context, BDA holds potential as a data-driven decision-making assistant. While there is extensive literature on BDA as a decision aid in SCs, mainstream research often focuses on the technical aspects or on smartening specific SC domains. To explore how BDA can be used as a decision-making assistant in SCs, it's essential to address the characteristics of a domain-independent BDA framework within the SC context and the practical considerations when implementing such a framework for SC decision-making. This foundation is illustrated through a use case that applies a BDA framework in the healthcare environment of an SC, demonstrating the framework's capability to support data-driven decisions in SCs [6].

Existing research explores the concept of smart cities and the role of the Internet of Things (IoT) and Machine Learning (ML) in realizing data-driven smart environments. Smart cities leverage technology and data to enhance citizens' quality of life and improve the efficiency of urban services. IoT and ML are identified as key technologies that enable smart city solutions by facilitating large-scale data collection, analysis, and decision-making. The research also compares various case studies of successful smart city implementations that utilize IoT and ML technologies. The findings suggest that these technologies have the potential to transform urban environments, making cities more livable, sustainable, and efficient. However, significant challenges remain regarding data privacy, security, and ethical considerations that must be addressed to fully realize the potential of smart cities [7].

2.2 The Need for Urban AI-Based Systems

In smart cities, artificial intelligence (AI) plays a crucial role in enhancing the efficiency of flexible spaces. AI is embedded in various smart city applications and infrastructure, often without citizens being fully aware of its "intelligent" features. By understanding and optimizing the real-time usage of spaces, AI can maximize the utilization of flex spaces. However, since AI can directly impact citizens' lives, there are uncertainties, concerns, and even fears associated with it. To address these issues, a human-centered AI (HCAI) approach is needed. This approach involves developing frameworks to understand citizen perceptions and offers insights into human-centered requirements that should be considered when designing AI applications for future smart cities [8].

3. Research Design

3.1 Analysis of Changing the Urban Sharing Platform (Community Personalization) Structure

Structural changes in living environments, such as those in dormitories, have been shown to significantly influence social interactions and community dynamics. Just as modifications to dormitory layouts led to increased sociability, enhanced relationships, and reduced conflicts among residents, similar structural changes in urban spaces or platforms can impact community dynamics and personalization.

In urban settings, the design and structure of shared spaces are crucial for fostering community building. Modern apartment designs now incorporate communal facilities like playrooms, dining areas, and leisure spaces, which encourage interaction among residents. These changes help residents naturally meet, engage, and support each other, ultimately contributing to a more vibrant and connected community. As individuals adapt to new structures and environments, community character evolves. This adaptation process helps form common norms and behaviors, leading to a stronger sense of community.

In conclusion, structural changes in cities or platforms are essential for promoting interaction, communication, and the formation of healthy communities. By moving away from traditional designs and

providing new shared environments, urban spaces can enhance community cohesion and personalization.

3.2 AI-Powered Selective Cities in the United States

In the United States, several cities are emerging as leaders in integrating artificial intelligence (AI) into urban infrastructure and services, often referred to as "AI-powered cities." These cities leverage AI to enhance efficiency, improve the quality of life for residents, and solve complex urban challenges, likely San Francisco is at the forefront of AI innovation, driven by its proximity

When examining the relationship between choice and capitalism, it becomes evident that not everyone can exercise the same level of choice, whether in a capitalist or socialist system. The extent of choice available to individuals varies based on their geopolitical context and specific circumstances. In highly individualistic countries like the United States, where personal freedom and choice are highly valued, there is a prevalent belief that anyone can aspire to become a president, astronaut, athlete, or famous musician. This belief is rooted in the idea that in a capitalist society, individuals have the freedom to pursue their dreams and ambitions, regardless of their background. However, this perspective often overlooks the systemic and structural barriers that can limit true equality of opportunity [10]. Over time, a common set of norms emerged across almost all areas, illustrating a process of conformity. This phenomenon can be broken down into two main aspects. Initially, residents had diverse attitudes, but over time, they experienced a process of conformity where their attitudes became more similar. As a result of the conformity process, individuals with various attitudes gradually began to adhere to shared norms. This suggests that even within urban districts, a similar process occurs where people align their behaviors and attitudes with those of others in their community.

This paper explores the complex processes of urban conformity and selection phenomena within the interactions between individuals and groups. It offers valuable insights into how urban transformation influences the formation and evolution of individual choices and group norms.

3.3 Geopolitical Conformity and Urban Development by AI coupling

Geopolitical conformity has significantly impacted urban development. Historically, the global supply chain was centered around the United States, which provided capital and markets, while other countries supplied raw materials and intermediate goods. For instance, Saudi Arabia and Russia supplied energy, while countries like South Korea and Germany excelled in manufacturing. This structure was reinforced after China's accession to the World Trade Organization (WTO) in 2001. However, recent trade tensions between the United States and China have led to the formation of new global supply chains, which can be categorized into four key axes. Firstly, the economic decoupling and de-risking between the United States and China are evolving into a recoupling phase. The partial separation of their economies is causing significant shifts in the global supply chain. Secondly, this axis refers to the creation of new supply chains centered around North America, specifically involving the United States, Canada, and Mexico. This regional coupling emphasizes closer economic integration and collaboration. Thirdly, China is developing its own supply chain to achieve self-sufficiency. This involves building an independent supply network and strengthening cooperation with countries like Russia and Iran through the Belt and Road Initiative (BRI). Fourthly, the role of AI-centric cities represents a new axis where global economic structures are being reshaped around AI technologies. AI-driven cities are becoming hubs of technological innovation and economic independence, essential for responding to global economic changes.

The transition to AI-driven urban environments involves not only technological challenges but also complex economic and financial issues. Cities must use AI to enhance energy efficiency, optimize financial

investments, and adapt to global economic shifts. This positions AI-centric cities as future economic powerhouses. In the face of a bifurcated global supply chain, individuals and regions must leverage local opportunities. For instance, South Korea can explore new markets through regional collaborations with countries like China, Japan, and other Asian neighbors. The transformation of shared cities into AI-based urban environments requires addressing geopolitical conformity and platform development.

This includes creating platforms (e.g., Naver, KakaoTalk), fostering shared citizenship, and ensuring smart city resources are in place. In summary, the reconfiguration of global supply chains and the rise of AI-centric cities highlight the need for strategic local and global responses. Understanding and adapting to these geopolitical and technological changes are crucial for shaping future urban development.

Therefore, the purpose of this paper model is to evaluate whether AI introduction can resolve income inequality and social conflict in smart cities, and digital sharing between countries as follows Figure 1.

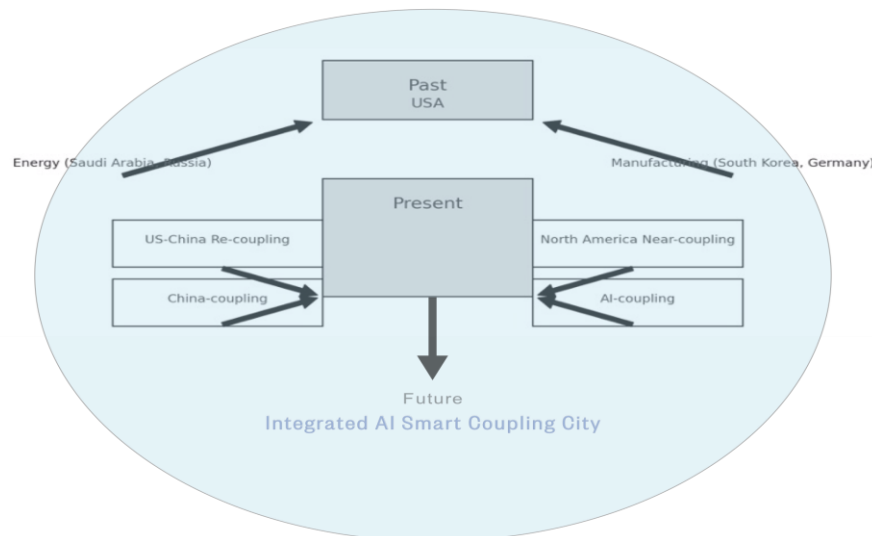


Figure 1. Changing the Geopolitical smart city platform (author)

For example, major Chinese e-commerce platforms such as TEMU and Shein have faced significant challenges due to recent trade regulations. These platforms, known for their low-cost goods, experienced rapid growth in the U.S. market. However, the new regulations have severely impacted their operations. According to Customs and Border Protection (CBP) data, the U.S. imported 750 million packages from China in the first half of 2024 alone, a sharp increase compared to the 1 billion packages imported throughout 2023. The escalating trade tensions between the U.S. and China have significantly impacted global e-commerce and supply chain dynamics such as TEMU and Shein. The regulatory challenges faced by Chinese e-commerce platforms highlight the broader consequences of these trade conflicts on international trade and economic relations.

Through the above model, I would like to present the following composition change hypothesis in the future.

Hypothesis Settings:

Hypothesis 1. The higher digital accessibility and AI readiness, the less income inequality in smart cities will be.

Hypothesis 2. The higher the participation of domestic companies, the more effectively AI technology will be utilized and urban income inequality will decrease.

Hypothesis 3. AI technology will be able to alleviate conflicts between migrants and existing cultures between countries.

3.4 Globalization of Cities: Issues in European Shared Mobility Systems (France)

As cities strive to become innovative and globally-oriented, they face significant challenges in implementing and managing smart city technologies, including shared mobility services. European cities have faced considerable difficulties with shared bicycle systems due to issues like theft and damage. Introduced in 2007, Vélib' is a large-scale shared bicycle system in Paris. Despite its scale, the system struggles with high rates of theft and damage. Of the 120,000 bicycles produced, approximately 100,000 have been lost or damaged.

In contrast, the shared bicycle system in South Korea, which operates approximately 43,000 bicycles as of 2023, has a notably lower theft rate compared to Europe. In 2022, only about 800 thefts were reported, reflecting a much lower rate of theft and damage compared to European systems. This success is attributed to higher civic awareness and more effective management practices. The South Korean model of shared bicycles integrates well with local management, maintenance, and cycling culture, leading to successful outcomes. European cities find it challenging to replicate the high levels of civic responsibility seen in South Korea. This difficulty in adopting similar practices may hinder their ability to achieve comparable success in shared mobility systems.

3.5 Immigration and Social Integration Issues in the Dutch Smart City Context

As the Netherlands advances towards becoming a smart city, it faces several significant challenges related to increasing immigration and social integration. Despite its reputation for high levels of freedom and welfare, the influx of immigrants has led to a range of social and economic difficulties that impact the development of smart cities.

The increase in immigrants has led to economic challenges, such as imbalances in the labor market, increased public spending, and rising housing prices. Immigrants from non-EU countries face difficulties entering the labor market, leading to higher dependency on government welfare. The increased demand for housing has exacerbated the housing crisis, particularly in a densely populated country like the Netherlands.

Immigrants, especially those from non-EU countries, struggle with language and cultural barriers, affecting their integration into Dutch society. This results in lower employment rates and increased social conflict. The social conflicts arising from immigration have led to political reactions, as seen in recent Dutch elections where anti-immigration policies gained traction. This political shift reflects growing negative perceptions of immigrants within Dutch society. To address these challenges, the Netherlands must develop data-driven policies. This includes creating strategies for immigrant integration, housing supply, and labor market participation based on comprehensive data analysis.

Effective immigrant integration requires educational and support programs, such as language training, job skills development, and cultural adaptation initiatives. These programs are essential for helping immigrants adapt to Dutch society and participate fully in the smart city economy.

First, expanding housing supply is crucial to accommodate the growing population. Accelerating housing construction projects and revising housing policies are necessary steps to address this issue. Second, to ensure that immigrants contribute positively to the Dutch economy, there must be efforts to create economic opportunities. This includes expanding employment opportunities, supporting entrepreneurship, and fostering small and medium-sized enterprises. Second, AI can play a crucial role in enhancing safety and security. Data analysis can help strengthen policing efforts and implement crime prevention programs, addressing concerns related to rising crime rates among immigrant populations. Third, maintaining political stability is vital for effective policy implementation. Transparent and fair policy development is needed to manage social tensions and foster integration.

The Netherlands faces significant challenges in its journey towards becoming a smart city, particularly in terms of managing the impact of increased immigration. Addressing these challenges requires a multifaceted approach involving data-driven policy development, comprehensive integration programs, expanded housing, economic opportunity creation, enhanced safety measures, and political stability. By focusing on these areas, the Netherlands can navigate the complexities of smart city development and create a more inclusive and resilient urban environment.

3.6 Geopolitical Importance of AI SNS Platforms (Naver's Challenges: The Line-Yahoo Situation)

In the era of AI-driven smart cities, the AI-based SNS (social networking service) market is becoming geopolitically crucial for platforms like Naver and Kakao in South Korea, as well as for Japanese counterparts. Understanding why these platforms are vital involves examining the challenges they face, especially in the context of recent developments such as the "Line-Yahoo" situation in Japan and the broader strategic importance of AI technologies in urban development. Naver's overseas expansion strategy has been heavily centered around its "Line" platform, particularly in Japan and Southeast Asia. However, the gradual termination of cooperation between Line and Yahoo Japan has created significant uncertainty. Japanese government regulations, such as the separation of cloud systems and the end of search engine technology cooperation, could severely impact Naver's business in Japan and beyond. If Naver divests its stake in A Holdings (the joint venture with SoftBank that includes Line and Yahoo Japan), it may struggle to maintain its Southeast Asian operations. With Line's governance structure shifting, Naver's influence could diminish, complicating its ability to sustain its business in these regions. Another critical area for Naver is its Webtoon business, which has shown signs of slowing growth. Despite global reach, the number of active and paying users has not increased significantly, making it challenging for Naver to break even or turn a profit in this segment.

In AI-powered smart cities, platforms like Naver and Kakao hold vast amounts of user data, which is essential for optimizing city infrastructure, services, and overall efficiency. Their role in data collection and analysis makes them indispensable for developing smart cities that can respond effectively to urban challenges. Smart cities require robust communication channels between citizens and the government. Domestic platforms like Naver and Kakao can serve as trusted intermediaries, ensuring that communications are reliable and aligned with national interests, thus contributing to geopolitical stability. The integration of various city services—such as transportation, healthcare, and education—is crucial for the success of smart cities. Platforms like KakaoTalk, which already integrates multiple services, could become the central hub for managing these smart city services, enhancing urban efficiency. The success of AI smart cities is closely tied to national competitiveness. If Naver and Kakao secure strong positions in the AI SNS market, it not only

boosts their corporate strength but also enhances the geopolitical standing of South Korea on the global stage. Security and privacy are critical concerns in AI smart cities. Domestic platforms like Naver and Kakao, which operate under South Korean laws and regulations, can offer more reliable data protection compared to foreign platforms. This trustworthiness is vital for maintaining social stability and national security. AI smart cities present new economic opportunities. Naver and Kakao are well-positioned to develop new business models that capitalize on these opportunities, driving economic growth and contributing positively to the national economy. Currently, Japan is facing significant demographic challenges, with predictions that by 2040, 50% of municipalities will have populations under 10,000, leading to declining property values and reduced tax revenues. This demographic shift poses a severe challenge to building and maintaining smart city infrastructure. Similarly, South Korea is grappling with aging and population decline, which complicates smart city development.

The construction of AI-driven smart cities in both Japan and South Korea faces significant challenges due to demographic changes and geopolitical factors. Platforms like Naver and Kakao are critical in this context, as they provide the technological infrastructure and data capabilities essential for smart city development. However, to overcome these challenges, continuous research, policy adjustments, and strategic international partnerships will be necessary. The successful integration of AI in smart cities will not only address these demographic and economic issues but will also enhance the geopolitical standing of these nations in a rapidly changing world.

3.7 Solving AI-Based Problems in Taiwan's Urban Social Structure

The challenges faced by Taiwan's millennial generation, including high living costs, stagnant wages, intense job competition, rising housing rents, economic uncertainty, overwork, and the need for overseas opportunities, can be partially addressed through the application of AI technology. Here's how AI can help. AI applications can help individuals manage their finances more efficiently by analyzing spending patterns, suggesting ways to reduce unnecessary expenses, and creating personalized savings plans. AI platforms can analyze labor market trends and recommend skill development programs tailored to individuals. This can help workers transition to higher-paying jobs with better growth prospects. AI can assist job seekers by analyzing their resumes and matching them with suitable job openings. It can also help with interview preparation and recommend roles that align with their strengths, giving them a competitive edge. AI can analyze housing demand and supply, helping to optimize the allocation of affordable housing in suitable areas. Additionally, AI-powered smart housing systems can reduce living expenses by enhancing energy efficiency. AI can analyze an individual's financial situation and recommend investment opportunities that minimize risk while maximizing returns, contributing to long-term financial stability. AI can automate repetitive tasks, reducing the amount of time spent on laborious activities. AI tools can also improve work efficiency, allowing for greater productivity within the same timeframe. AI can analyze global employment trends and help individuals find suitable job opportunities abroad based on their skills and experience. AI can also provide cultural adaptation training to ease the transition to living and working in a new country.

AI has the potential to address many of the social and economic challenges faced by Taiwan's millennial generation. By offering personalized support, easing structural issues, and improving the overall quality of life, AI can be a crucial tool for empowering young people in Taiwan. However, these AI solutions must be implemented alongside broader policy support to be truly effective.

3.8 Ireland’s Case Study on Discrepancy Between GDP and Actual Income

Ireland’s experience in smart city development reveals significant challenges, particularly in ensuring that AI-driven growth benefits all citizens. Despite a high per capita GDP fueled by multinational IT companies, the reality for many Irish citizens is starkly different, with rising income inequality and poverty. While these companies contribute to GDP, they do little to promote sustainable economic development within the country. The country's heavy reliance on multinationals skews economic indicators, creating a gap between GDP and the actual income available to its citizens. This discrepancy leads to social and economic disparities, which hinder efforts to create an inclusive smart city. As AI becomes integral to urban development, it is crucial to address these inequalities. AI-driven growth must be inclusive, focusing on equitable distribution of economic benefits. Ireland's smart city initiatives must prioritize sustainable development, social equity, and broad-based well-being. This involves reducing dependency on multinationals, enhancing public investment in infrastructure, and fostering domestic industries that contribute directly to the local economy.

To truly align AI readiness with digital equity, Ireland must implement policies that ensure all citizens, not just a privileged few, benefit from smart city innovations. This approach will help bridge the gap between economic indicators and the real quality of life for its residents, creating a more resilient and inclusive urban future.

4. Empirical analysis

To study the importance of AI smart cities through path analysis, variables related to the construction of smart cities in each country were set, and causal relationships between Seoul cities in Korea were analyzed. Since it is to identify the path with each sample, the sampling was small, so it was analyzed through cross-validation, Ridge, and Lasso regression analysis.

4.1 Lasso regression analysis

Through statistical analysis with Korean urban data, economic indicators, smart urbanization indicators, modified GNI, foreign migrant rates, and digital accessibility were derived as correlations.

Ridge Regression			Results:			Lasso Regression			Results:		
	Metric		Value		Metric		Value				
	Mean CV	Score	-155.692903		Mean CV	Score	-40.798054				
1	coefficient of Seoul Digital Accessibility (%)		0.263940	1	coefficient of Seoul Digital Accessibility (%)		0.000000				
2	coefficient of Seoul Digital Access Security (%)		-0.263940	2	coefficient of Seoul Digital Access Security (%)		0.000000				
3	coefficient of Smart city index (Seoul)		-1.949152	3	coefficient of Smart city index (Seoul)		-2.669060				
4	coefficient of GNI per person in Seoul		0.251623	4	coefficient of GNI per person in Seoul		0.000000				
5	coefficient of Private consumption per person ...		-0.355533	5	coefficient of Private consumption per person ...		0.000000				
6	coefficient of Number of foreign immigrants (i...		-1.401420	6	coefficient of Number of foreign immigrants(i...		0.000000				
7	coefficient of Mobility_index		-0.840434	7	coefficient of Mobility_index		0.000000				
8	Intercept		74.850000	8	Intercept		74.850000				

Source : Seoul Digital Accessibility (%) & Seoul Digital Access Security (%) (Major results of the 2023, 2021 Seoul citizens' digital competency survey, Seoul Digital Foundation);GNI per person in Seoul (Seoul Open Data Square);Private consumption per person in Seoul(Statistics Office);AI

readiness index (Korean government's artificial intelligence preparation index -Oxford Insights Government AI Readiness Index);IMD Smart city index (Seoul); Number of foreign immigrants including national acquisition(Seoul Foreign Residents General by Division Statistics).

4.2 Path analysis

When the correlation between each other is analyzed through path analysis(e.g., LISREL, semopy), AI preparation and GNI per capita have moderate positive correlation (0.496): higher AI readiness is associated with higher GNI per capita. This suggests that economic prosperity is associated with technological advances. Simple path analysis as follows Figure 2:

This is because the emergence of new technologies such as non-face-to-face and unmanned kiosks, expansion of non-face-to-face services, and Generative AI is another barrier to the elderly and the digital weak, who have been limited in the use of living devices as they spread and become more common. The correlation matrix provides insight into the relationships between various indices and metrics related to AI readiness, digital accessibility, and socioeconomic factors in Seoul. Here's a summary of the key correlations: First, AI Readiness Index: - Strong positive correlation with GNI per person in Seoul(0.495), - Weak positive correlation with Seoul Digital Accessibility(0.294), - Weak negative correlation with Seoul Digital Access Security (-0.294), - Strong negative correlation with the Smart City Index (-0.977). Second,Seoul Digital Accessibility: - Moderately positive correlation with Mobility Index(0.376), - Weak positive correlation with Private Consumption per person(0.191), - Strong negative correlation with Number of foreign immigrants (-0.840). Third, Seoul Digital Access Security : - Shows an inverse relationship with Seoul Digital Accessibility (-0.294), - Strong inverse correlation with Smart City Index(-0.977) and GNI per person in Seoul (-0.496). Fourth, GNI per person in Seoul: - Strong positive correlation with Mobility Index (0.821), - Moderate positive correlation with Private Consumption per person (0.721), - Moderate negative correlation with **Number of foreign immigrants (-0.516). Fifth, Mobility Index: - Positive correlation with GNI per person (0.821) and Private Consumption per person (0.721).

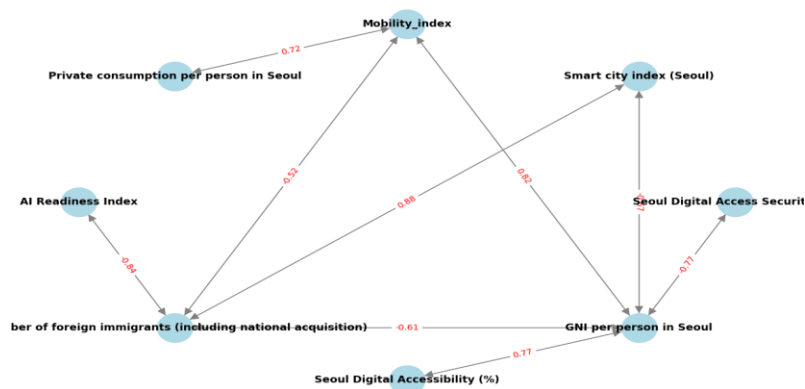


Figure 2. Path analysis

These correlations suggest that while higher AI readiness and GNI per person are positively linked, the Smart City Index has a strong inverse relationship with AI readiness. Additionally, the number of foreign immigrants shows a negative correlation with digital accessibility and GNI per person, indicating potential disparities in how different populations experience digital and economic access in Seoul.

5. Conclusion

As the smart city expands, welfare becomes more prosperous and income needs to increase, but rather, there is a phenomenon of decreasing. It is hoped that life in a smarter city will solve this problem of income or unequal sharing by introducing AI. However, digital and AI used in practice are not their own technology, industry, or their own capital, and income inequality such as housing supply were examined. In this way, it was analyzed whether AI smart cities would have unreasonable results if they could not be operated as their own companies. In addition, there is a phenomenon that is contrary to the existing culture by migrants, not their own citizens, and it was analyzed whether the situation changes with AI technology.

Therefore, it is important to clearly understand this relationship through empirical analysis and to provide the necessary basis for decision in the AI era. In particular, it lays the foundation for responding to various challenges faced by these AI future cities and providing a better quality of life for the people in the country. Therefore, the integration of society is essential in the AI era, which proposes to establish important values for sustainable smart city development.

There is some agreement between the content of the conclusion and the statistical analysis results presented, but overall, there needs to be a clearer connection. Hypothesis refers to AI and smart cities addressing inequality, emphasizing the importance of their own companies, and the role of migrants and AI technology. However, statistical analysis mainly deals with correlations such as AI readiness, digital accessibility, income, and number of migrants, so some adjustments are needed. Identifying the correlation between AI readiness and digital accessibility in statistics can be linked to conclusions addressing the digital gap problem in smart cities. The analysis of the correlation between income, AI readiness, and the number of migrants is related to the discussion of income inequality and the role of AI mentioned in the conclusion.

References

- [1] D.S. Seo., "Study on the Failure of Autonomous Mobility in World Network Cities", *The International Journal of Internet, Broadcasting and Communication*, vol.15, no.3 pp.73-81. 2023.
doi:<http://dx.doi.org/10.7236/IJIBC.2023.15.3.73>
- [2] Reynolds, Matt. "Could New York City's AI Hiring Law Be a Model for Other U.S. City and State Regulations?" *110 A.B.A. J.* 10 (2024) / *ABA Journal*, Vol. 110, Issue 1 (February/March 2024), pp. 10-12.
- [3] Mageto, Joash, Hossana Twinomurinzi, Rose Luke, Siyabonga Mhlongo, Kelvin Bwalya, and Stella Bvuma. 2022. "Building Resilience into Smart Mobility for Urban Cities: An Emerging Economy Perspective." *International Journal of Production Research* 62 (15): 5556–73.
doi:10.1080/00207543.2022.2139866.
- [4] Abdullah, Intan Nazuha,,Alan Chong Kim Wing Cheng Chin Tiong Ahmad Karim, Nur Amalina. "The Impacts of Urban Design on Community WellBeing with The Smart City Integration." *Global Business & Management Research*. 2024 Special Issue, Vol. 16 Issue 2, p758-776. 19p.
- [5] Kangjuan Lyu Min Hu Juan Du Vijayan Sugumaran. "AI-Based Services for Smart Cities and Urban Infrastructure", *Advances in Computational Intelligence and Robotics (ACIR) Book Series*: 2021
- [6] Shahat Osman AM, Elragal A. Smart Cities and Big Data Analytics: A Data-Driven Decision-Making Use Case. *Smart Cities*. 2021; 4(1):286-313. <https://doi.org/10.3390/smartcities4010018>.
- [7] Ullah, A., Anwar, S.M., Li, J. et al. Smart cities: the role of Internet of Things and machine learning in realizing a data-centric smart environment. *Complex Intell. Syst.* 10, 1607–1637 (2024).

<https://doi.org/10.1007/s40747-023-01175-4>.

- [8] Lehtiö, AnuAff., cor1Hartikainen, MariaAla-Luopa, SaaraOlsson, ThomasVäänänen, Kaisa. "Understanding citizen perceptions of AI in the smart city" *AI & SOCIETY: Journal of Knowledge, Culture and Communication*. 38(3):1123-1134
- [9] J. Deregewski et al., *Expiscations in Cross-Cultural Psychology*(1983), pp. 335~355.
- [10] Reynolds, Matt. "Could New York City's AI Hiring Law Be a Model for Other U.S. City and State Regulations?" *110 A.B.A. J. 10* (2024) / *ABA Journal*, Vol. 110, Issue 1 (February/March 2024), pp. 10-12.
- [11] Andrew Baum & Glenn Davis (1980). "Residential Environments: Toward an Integration of Community Development and Environmental Psychology". *CNA Insider*, "Millennials in Taiwan: Coping with Economic Realities".