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PEOPLE'S PARTICIPATION IN DEVELOPING THE CAPITAL CITY OF LUANG PRABANG TOWARD A SMART CITY

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Abstract

The research aims to 1) investigate the people's knowledge and understanding of the development of Luang Prabang as a smart city and 2) investigate the external environmental factors that influence people's involvement in the transformation of Luang Prabang into a smart city. The study's sample group comprises 153 indigenous individuals from the Xiengthong, Wat That, Visoun, and Mano groups residing in the World Heritage Area. We utilized a questionnaire to gather data and statistics, including frequency, percentage, average value, and standard deviation. We then analyzed the survey data using multiple regression equations. The research findings revealed that the study examined the knowledge and understanding of Luang Prabang's development as a smart city among 293 residents of the World Heritage area. Overall, the level of knowledge about Luang Prabang's development as a smart city is high, accounting for 50.33%. This is followed by an intermediate level of knowledge-understanding at 28.10%, and a low level of knowledge-understanding at 21.57%. 2) The level of external environmental factors, with an average value of 3.95 and a standard deviation of 0.69, significantly influences participation in the development of Luang Prabang capital towards a smart city, with a mean value of 3.62 and a standard deviation of 0.88. Two external environmental factors, namely social and regulatory-legal factors, significantly influence people's participation in the development of Luang Prabang capital towards a Smart City, showing a positive correlation at a statistical significance level of 0.05. As for political factors, economic factors, technological factors, and natural environment factors, there is no effect on participation in the development of Luang Prabang capital to become a smart city at a statistical significance level of 0.05.

Keywords: People's Participation, Smart City, PESTEL Analysis, Lao PDR.

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Introduction

The Luang Prabang Smart and Integrated Urban Strategy was prepared by the Luang Prabang provincial government, with the ASEAN Australia Smart Cities Trust Fund assistance and is based on extensive consultations with public and private stakeholders during mid-2022 through mid-2023. It outlines a smart city strategic infrastructure plan to achieve Luang Prabang's ambition to become a more livable heritage city for all. This ambition statement encapsulates the city's key attributes: its heritage, urban fabric, and its people. Three strategic pillars: (i) Integrated Tourism and Heritage Destination, (ii) Clean and Safe Environment, and (iii) Sustainable Villages and a 15 Minute City, guide the specific strategies and smart city projects required to realize Luang Prabang's livable heritage city ambition. Under the pillar Integrated Tourism and Heritage Destination, Luang Prabang is envisaged as a sustainable destination that protects and leverages its built, natural, and intangible cultural heritage. Smart city projects include a dynamic electronic ticketing system for tourist attractions, real-time site monitoring, and heritage impact assessment guidelines. The Clean and Safe Environment pillar will provide Luang Prabang residents and visitors with the infrastructure and services needed to ensure a livable urban environment, such as clean water, clean streets, and safe sanitation. Smart city projects include smart septic tank systems, storm drains with gross pollutant traps, and electric waste collection vehicles. Under the Sustainable Villages and 15 Minute City pillar, Luang Prabang's urban management and transport systems will be transformed to strengthen community participation and reduce congestion and pollution. Smart city projects include self-sustaining urban villages where residents assemble to live, work, play, learn, and enjoy public spaces. Pedestrianization of the World Heritage Site, traffic simulation to improve transport planning, and smart shuttle services are also prioritized. An overarching integrated spatial planning approach factoring heritage, tourism, and sustainability considerations, and a comprehensive geographic information system will guide these efforts, the strategy will be implemented under the supervision of a steering committee chaired by the provincial governor and supported by multisector working groups. Each working group will oversee one of the three strategic pillars, ensuring that smart city initiatives across the different domains are aligned with the overarching ambition and contribute to urban sustainability, resilience, social inclusion, and livability outcomes.

The Luang Prabang Smart and Integrated Urban Strategy identifies smart city solutions to facilitate sustainable urban and tourism growth, address urban management problems, and preserve Luang Prabang's distinctive built, natural, and intangible heritage. Tourism, heritage, water supply, sanitation solid waste management, climate change and disaster management, transport and information and communication technology (ICT) are the main sectors addressed. Preparation of the strategy was supported by the Asian Development Bank (ADB) administered Association of Southeast Asian Nations (ASEAN)-Australia Smart Cities Trust Fund (AASCTF) financed by the Government of Australia through its Department of Foreign Affairs and Trade. The AASCTF delivers innovative approaches and capacity building to facilitate the smart and equitable transformation of ASEAN cities. AASCTF objectives are to improve adaptation and adoption of digital solutions in city planning systems, service delivery, and financial management. This enables cities to be more livable, resilient, and inclusive. Experts engaged by global consulting firm Ramboll assisted the Luang Prabang provincial government to prepare the strategy. Preparation of the strategy followed a three-stage process (Figure 1). In the urban assessment stage, data and documentation were analyzed to identify the city's current challenges and opportunities, including from a gender equality, disability, and social inclusion (GEDSI) perspective. Community leaders, civil society, government officials, entrepreneurs, youth, and women working in the night market were consulted in person and through online surveys to understand their aspirations for the city. In the urban scenario stage, population and visitor numbers were projected up to 2040, with

urban scenarios postulating different urban growth trajectories. In the integrated strategy stage. Smart City solutions were identified and prioritized to address urban problems identified in the prior stages. Implementation guidelines were co-developed with local stakeholders (Asian Development Bank, 2023).

The value of being a smart city of Luang Prabang capital in terms of tourism and population growth has resulted in the expansion of the city along with the creation of new economic opportunities. However, the growth has also brought challenges to the city such as traffic congestion, waste disposal and waste water discharge without management, overcrowding and the loss of natural wetlands and ponds which affect the way of life as well as the protection of the world heritage of the city. As of April 15, 2019, the Lao People's Democratic Republic will have a special form of local government: "Luang Prabang Capital" (Decree of the Prime Minister of the Lao PDR No.126/PM dated April 11, 2019 regarding the establishment of Luang Prabang Capital instead of Luang Prabang District). It is an upgrade of the local administration of the main city, Luang Prabang, by defining the same level of local governance as the district, in line with Luang Prabang province. (Decree of the President of the LAO People's Democratic on the Promulgation of the Law on Local Administration, President's office No.60/PO). Determined the characteristics of the city that can upgrade the civil administration to a city from the population and the number of tourists who come to visit is constantly increasing, if the problem is not solved, it will cause an unavoidable effect.

From the above, the researcher is interested in studying the knowledge-understanding of the people about the development of Luang Prabang as a smart city and the factors in the external environment that affect the participation of the people in the development of Luang Prabang to become a smart city. By creating a questionnaire to collect the views of the stakeholders on what are the challenges of the city, the opportunities and priorities of the development, showing that the participation of the people is the biggest challenge that the community is facing. Preservation of local heritage, protection of green and natural areas and leading to a sustainable lifestyle are prioritized by the residents in order to bring the results of education to improve the efficiency of public services and use it as a guide for the development of Luang Prabang as a smart city in the next stage. Objectives of the study (1) To study the knowledge-understanding of the people about the development of the capital city of Luang Prabang as a smart city. (2) External environmental factors that affect people's participation in the development of the capital city of Luang Prabang to become a smart city.

Literature Review

From the study, it was found that the knowledge-understanding about the development of Luang Prabang as a smart city from the people living in the World Heritage area in 8 aspects including (Smart Environment), (Smart Energy), (Smart Economy), (Smart Mobility), (Smart People), (Smart Living), (Smart Governance), (Smart Tourism) Overall, the level of knowledge score for the development of Luang Prabang is a smart city at a high level, followed by knowledge-understanding at a medium level and knowledge-understanding at a low level, also in line with Asian Development Bank (2023). By defining the strategic infrastructure plan of Smart City in order to follow the objectives of the capital city of Luang Prabang, which aims to become a world heritage city that is livable for everyone, with the important characteristics of the city including: heritage, special features of the city and lifestyle, and also defining the strategic pillars as follows: (1) Integrated tourism and cultural heritage; (2) A clean and safe environment; (3) Sustainable village groups and urban thinking 15 minutes-guidelines for specific strategies and smart city projects that take into account the desire of a world heritage city within the capital city of Luang Prabang. In accordance with the research of Chansavang et al. (2021). In the topic of challenges, possibilities and

development guidelines, the capital city of Luang Prabang is a smart city. The development of the city to become a smart city is considered very necessary for the city to be modern. Which means the installation of sensors (Sensor) to bring data to be analyzed and the promotion of the creation of a digital platform (Digital) for Luang Prabang capital city has many potentials in the development of the city to become a smart city as mentioned above. Therefore, the development of Luang Prabang capital city to become a smart city of Luang Prabang province is in line with Prawanne (2020). Conducted a research study on the process of transforming into a smart city. The case study of Khon Kaen District. The results of the research found that the process of becoming a smart city has started since 2013 with a focus on development in 7 areas: (1) Smart Citizens, (2) Smart Living, (3) Smart Education, (4) Smart Economy, (5) Smart Environment, (6) Smart Transportation, and (7) Smart Management. As for the impact of the process of becoming a smart city, the researchers found that if the project is successful, it will lead to changes in a better direction, that is, people will have more knowledge. Together we save energy and get clean energy. Reduce costs and beautify the city's landscape. These things will help. In accordance with the research of Nua-amnat et al. (2021). Studying the development of knowledge and community elements of "Smart Community" for communities in Thai society. Study lessons to 1) Analyze the knowledge and creative community "Smart Community" of the Thai community 2) Develop the creative community "Smart Community" of the Thai community and 3) Create the creative community "Smart Community" of the Thai community. Qualitative research, study in the form of documents, proceed from ideas, theories, documents and conclusions to analyze and synthesize the factors that influence the community and are different from the research of Chittmittrapap et al. (2022). Conducted a research study on the factors that promote success in the development of Smart City in Phuket Province. The results of the study found that (1) The current situation of Phuket as a smart city cannot develop into a sustainable way of life. Due to the lack of integration, lack of coordination, information between various organizations, lack of cooperation from the private sector in the participating areas, limited budget and the existing laws and regulations are not in line with the smart city development policy, (2) The factors related to the development (Smart City) of Phuket Province include 3 factors: the public sector, the private sector and the public sector for Kittinaraporn (2020). Conducted a research study on the factors that affect becoming a smart city, the case study of Tha Keng Municipality. The results of the qualitative research found that the problems that the parties involved in all 4 sectors meet are: littering, there are limited resources of waste located near the community and the road is scary, the second most common problem is that there is garbage in the houses along the canal, there are many roadsides that are often shut off, water does not flow and there is air pollution from cars and trucks. Less common are the mental health problems of children, youth and community members who are unable to manage things in the community on their own. Also different, Jenrangsarn & Saengkord (2019) conducted a study to develop the municipality into a smart city in Khon Kaen province. The results of the study found that 6 municipalities in Khon Kaen province are aware and ready to push the development of the area to become a smart city according to the Khon Kaen development plan. Personnel lack of preparation, lack of understanding, lack of sufficient budget. Continue to operate and have an infrastructure system that is not ready to be a smart city, which is a guide for developing the municipality into a smart city in Khon Kaen province. There must be development in various areas, including the intelligent environment. Smart economy after smart work, smart citizens, smart living, smart transportation and smart state administration. Therefore, the government should provide fiscal support as well as provide knowledge using modern technology and innovation to increase the efficiency of urban management to become a smart city with the cooperation of the public, private and public sectors.

From the research, it was found that the level of external environmental factors that make participation in the development of Luang Prabang capital to move towards a smart city is very important, including 2 factors, namely social factors and regulatory-legal factors, which have a positive relationship with participation in the development of Luang Prabang capital towards a smart city, while political factors, economic factors, technological factors and natural environment factors do not affect participation in the development of Luang Prabang capital towards a smart city. Also, consistent Wongmanee (2018) conducted a research study on Smart City development: Case study of Pathum Thani Province. The results of the study found that the area of Pathum Thani Province has the potential to be developed as a (Smart City) is quite high. But the smart city development of Pathum Thani province still has problems, which problems can be summarized as follows: (1) The problem of basic elements (plans, policies, laws) Pathum Thani province lacks the appropriate policy tools for urban development are policy measures or tools for implementation. This will be used as a smart city development scope is not clear enough, (2) The problem of the structure and operation of the organization is found to be only gear group. There is only one task within the organization involved in the development of smart cities, making it a coordinated list within the department, making it impossible to query information from all departments. This results in a lack of common goals within the organization (Klinhom, 2023). A case study of the factors affecting people's participation in the progress towards a smart city in Si Thammarat Municipality. The purpose of this study is (1) to study the level of people's participation; On the road to the smart city, (2) to study and compare people's participation in the journey to the smart city, arranged according to individual factors, (3) to study the perception of the smart city and the impact of the people's participation in the transition to the smart city (4) to study the attitude towards the smart city and the impact of the people's cooperation on the way to the smart city, the results of the study found the level of participation of citizens in the road to the smart city Independence throughout the country is at a high level, when considering each aspect, it can be seen that the areas have the highest average participation in benefits, followed by participation in the next operation is participation in monitoring and evaluation and participation in decision-making respectively. There is also proximity to Kokphon & Kitiyodom (2012), public participation means that people participate in the activities of a government organization for the benefit of the public, starting from joint thinking, joint planning, cooperation, participating in monitoring and evaluation and participating in the benefits. In addition, participation refers to a two-way communication process that aims to create better decisions and public support, which is the goal of the process. Decisions in that matter, including on the basis of equality, people have the same rights as other participants and have the ability to participate and are close to Creighton (1994). He said that participation is a continuous process with 4 important steps: providing information to the people, receiving people's opinions, participating in problem solving and developing a joint agreement. Therefore, from the discussion and based on many examples of smart city, the important problem is that people must participate in the development of Luang Prabang as a smart city because it is an initiative that may not be perfect. There may be many problems that have not been met in development, but it must be based on the development plan of Luang Prabang as a smart city The context should be appropriate to the current situation of the people including solving the basic problems of the city and developing the city according to scientific principles along with the world heritage as well as in accordance with the culture, social economy and sustainable urban environment in the future, forming the framework for research concepts.

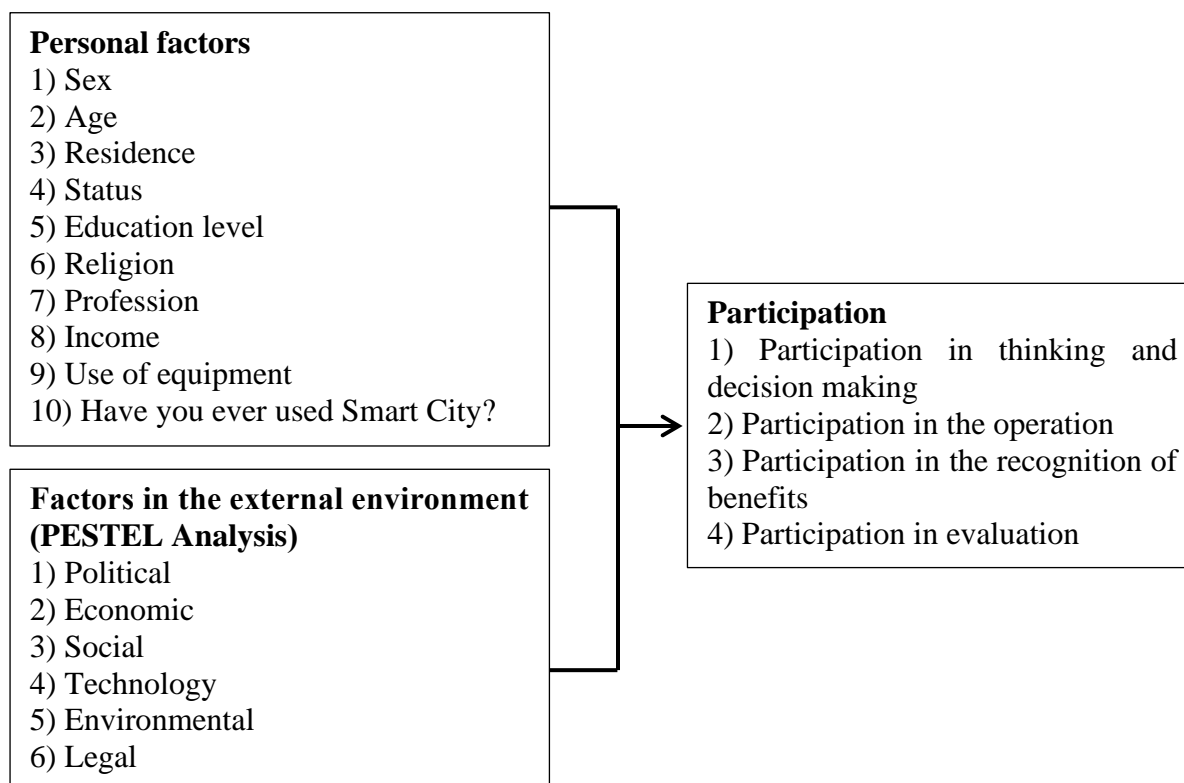


Figure 1 Conceptual Framework

Research Methodology

In this research, it is a mixed qualitative and quantitative study in which the data used in the research comes from the questionnaire of the people and public sector offices within the Luang Prabang capital by identifying 4 sample groups in the world heritage area with a total of 30 villages as a case study. It includes the steps of creating research tools, gathering data by analyzing the environmental factors that affect people's participation in the development of Luang Prabang as a smart city in 8 aspects, the model used in the study and the data analysis method by the SPSS program. In order to investigate the external environmental elements impacting public engagement in Luang Prabang's growth as a smart city, the study uses a mixed-method approach, combining quantitative and qualitative data.

Research Design

In order to identify and analyze external environmental factors (political, economic, social technological, environmental, and legal) that impact public involvement, the study uses a descriptive and correlational research design. Residents of Luang Prabang's World Heritage region was given a structured survey to complete in order to gather the data.

Sample Selection

153 native inhabitants from four significant village groups—Xiangthong, Wat Thad, Visoun, and Mano—make up the sample group. Because these villages are part of Luang Prabang's World Heritage site, participants are guaranteed to represent the community most impacted by the development of the city's smart city. Purposive sampling is used, with an emphasis on people who are at least 18 years old, have lived in the area for a considerable amount of time, and are aware of the city's growth ambitions.

Research Tools

The tool that will be used in this research is a questionnaire. The researcher will rely on the demographics of the population aged 18 and above who live in the world heritage area of Luang Prabang. Based on the time frame, a sample group of 153 people can be collected in the study. There are a total of 30 villages from the indigenous people of the world heritage

area in the Xiengthong group, the Wat Thad group, the Vishun group and the Mano group Multiple regression equation in survey data analysis (Ministry of Home Affairs of the Lao PDR., 2022). A structured questionnaire was used as the primary tool for data collection. The questionnaire is divided into three sections.

- 1) Demographics: occupation, education level, age, gender, and place of living, among others.
- 2) Knowledge and Understanding: Evaluating participants' familiarity with the evolution of Luang Prabang as a smart city.
- 3) External Environmental issues (PESTEL Analysis): Using a 5-point Likert scale, this method assesses how political, economic, social, technological, environmental, and legal issues affect public participation.

Data Collection

A group of researchers went to collect data by themselves by distributing questionnaires to the people in 4 groups from 293 people living in the World Heritage Area and collecting information from the questionnaires of 153 people. Questionnaire answers are given according to the facts after the people have answered and collected the data systematically including checking the accuracy and completeness and entering the data into the SPSS program to analyze and translate the research results.

Reliability and Validity

To guarantee reliability, the questionnaire underwent pre-testing. Good internal consistency was shown by the external factors section's Cronbach's alpha, which was above 0.7. By comparing the questionnaire's content to accepted frameworks for public engagement and smart city development (PESTEL model), data validity was guaranteed

The Model Used in the Study

The model that uses the study of external environmental factors that affect people's participation in the development of Luang Prabang to become a smart city uses a multiple regression equation and is based on the research model of Kaewtan (2014) and Kruntkan (2015) as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \bar{e}$$

Y = People's Participation

X₁ = Political factors

X₂ = Economic factors

X₃ = Social factors

X₄ = Technology factors

X₅ = Environmental factors

X₆ = Legal-Regulatory factors

\bar{e} = Expectations of valuation

Data Analysis

Data analysis is the process by which the student, after collecting data from all the questionnaires, verifies the accuracy of each one. Next, take all the data and analyze it using SPSS in each section of the questionnaire. Then, analyze it using descriptive statements, as shown in the following questionnaire:

Part 1: The analysis of personal factors of the people in the capital of Luang Prabang is a quantitative analysis with descriptive statistics including frequency, percentage.

Part 2: Analysis of knowledge-understanding about the smart city is a quantitative analysis with descriptive statistics, including mean values and standard deviation values.

Part 3: Analysis of environmental factors in the analysis of Luang Prabang capital (PESTEL Analysis) as a smart city is a quantitative analysis with descriptive statistics consisting of average values and standard deviation values.

Part 4 : The analysis of people's participation in moving towards a smart city in Luang Prabang is a quantitative analysis in a multiple regression equation model with the Stepwise method which has Pearson correlation, (R^2) and T-test.

Research Results

From Table 1, it was found that the knowledge-understanding about the development of Luang Prabang as a smart city from 293 people living in the World Heritage area in 8 aspects including smart environment, smart energy, smart economy, smart mobility, smart people, smart living, smart governance, and smart tourism. Overall, the level of knowledge on the development of the capital Luang Prabang as a smart city is at a high level, accounting for 50.33%. followed by knowledge-understanding at an intermediate level of 28.10% and knowledge-understanding at a low level of 21.57%.

From Table 2, it is found that the importance level of the external environmental factors that contribute to the development of Luang Prabang capital to move towards a smart city is given a high level of importance with an average value equal to 3.95 and a standard deviation value equal to 0.69. The ranking of the average value from large to small comes from: political factors, economic factors, social factors, regulatory-legal factors, technological factors and natural environment factors respectively.

Table 1 People's knowledge-understanding about the development of the capital city of Luang Prabang as a smart city.

No	Knowledge score level	Score threshold	Number	Percent (%)
1	The lower the level of knowledge, the lower the score (60%)	0-24 Score	33	21.57
2	Intermediate level of knowledge (60%-79%)	24-31 Score	43	28.10
3	High level of knowledge (80% up)	32-40 Score	77	50.33
Total			153	100

Table 2 Number, mean, standard deviation, and importance level of external environmental factors in participation.

No	Participation factor	n	Mean	S.D.	Level of importance
1	Political factors	153	4.13	0.72	High
2	Economic factors	153	3.99	0.76	High
3	Social factors	153	3.93	0.72	High
4	Technology factors	153	3.92	0.81	High
5	Environmental factors	153	3.80	0.84	High
6	Legal-Regulatory factors	153	3.93	0.84	High
Total		153	3.95	0.69	High

From Table 3, it is found that the level of importance of participation in the development of Luang Prabang capital to move towards a smart city is very important with the average value equal to 3.62 and the standard deviation value equal to 0.88. In which the ranking of the average value from large to small comes from: participation in benefit recognition, participation in operations, participation in decision-making and participation in evaluation, respectively.

Table 3 Number, mean, standard deviation and level of importance of people's participation in the development of the capital city of Luang Prabang to become a smart city.

No	Participation	n	Mean	S.D.	Level of participation
1	Participation in thinking and decision making	153	3.55	1.01	High
2	Participation in the operation	153	3.62	0.97	High
3	Participation in the recognition of benefits	153	3.84	0.81	High
4	Participation in evaluation	153	3.49	1.09	High
Total		153	3.62	0.88	High

From Table 3 and Table 4, it is found that the Pearson correlation coefficient of each pair of independent variables is less than 0.80, indicating that the independent variable of the equation in the research model does not have the problem of multi-collinearity. Then, political factors (X_1), economic factors (X_2), social factors (X_3), Technology factor (X_4), natural environment factors (X_5), legal-regulatory factors (X_6) to evaluate the regression equation of the multiple regression equation model with the Stepwise method Legal-regulatory factors that have a positive relationship with participation in the development of the capital city of Luang Prabang to move towards a smart city at a statistical significance level of 0.05. Political factors, economic factors, technological factors and natural environment factors do not affect participation in the development of the capital city of Luang Prabang to become a smart city at a statistical significance level of 0.05 respectively.

Table 4 Correlation problem of independent variables (Multi-collinearity)

Pearson Correlation	X1	X2	X3	X4	X5	X6
X1 (Political factors)	1					
X2 (Economic factors)	0.733**	1				
X3 (Social factors)	0.692**	0.769**	1			
X4 (Technology factors)	0.690**	0.712**	0.797**	1		
X5 (Environmental factors)	0.707**	0.684**	0.709**	0.790**	1	
X6 (Legal-Regulatory factors)	0.656**	0.666**	0.773**	0.703**	0.781**	1

**Correlation is significant at the 0.01 level (2-tailed).

Table 5 Results of the multiple regression equation analysis of external environmental factors that affect people's participation in the development of the capital city of Luang Prabang to become a smart city.

Coefficients (The coefficient of the prediction equation)					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.616	0.311		1.981	0.049
1 Social factors	0.417	0.122	0.341	3.426	0.001
Legal-Regulatory factors	0.349	0.104	0.333	3.350	0.001

a. Dependent Variable: Y(Participation)

Method: Stepwise R Square = 0.403, F = 50.580 (p = 0.000)

Conclusion and Discussion

External environmental factors that affect people's participation in the development of LuangPrabang to become a smart city from the study of people's knowledge-understanding about the development of LuangPrabang as a smart city and external environmental factors

that affect the people's participation in the development of LuangPrabang to become a smart city from the distribution of questionnaires to the residents of the world heritage area in the Xiengthong group, the Wat That group, the Visoun group and the Mano group using the questionnaire as a tool to collect data and statistics used in the analysis such as frequency, percentage, average value, and standard deviation and use multiple regression equations to analyze survey data. It was found that 1) People's knowledge-understanding about the development of LuangPrabang as a smart city from the people living in the heritage area including the level of knowledge about the development of LuangPrabang as a smart city is at a high level, followed by knowledge-understanding at a medium level and knowledge-understanding at a low level. 2) External environmental factors that make the development of the inner city of Tree, the development of the development of the people in the development of the Lao PDR Rules - The law, which has a positive relationship for the development of Territory capital to the city of Statistics at the District 0.05. As for the political factors, economic factors, technological factors and natural environment factors do not affect the participation in the development of Luang Prabang capital to become a smart city.

Practical Implications

The research's practical consequences offer policymakers and urban planners' important information for the development of Luang Prabang's smart city. According to the study, the two main forces behind public engagement are social and legal-regulatory elements. By establishing venues for active community involvement, such as public consultations, online tools for participation, and awareness campaigns that promote social inclusion and cohesiveness, policymakers can improve citizen engagement. Legal-regulatory structures should also be modified to guarantee accountability, openness, and simplicity in decision-making. Trust and engagement can be increased by streamlining legal processes and defining precise rules for citizen participation. Furthermore, locals will be more supportive of smart city projects if they are in line with the local heritage and culture. These results imply that successful smart city development in Luang Prabang will depend on implementing inclusive governance and having effective lines of communication between the public and the government.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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